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Your COMPUTER

► APRIL 1986 VOL. 6 NO. 4

BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE

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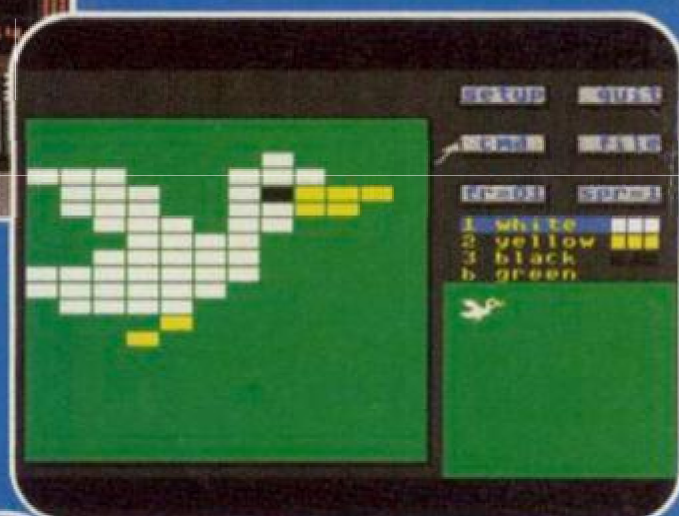
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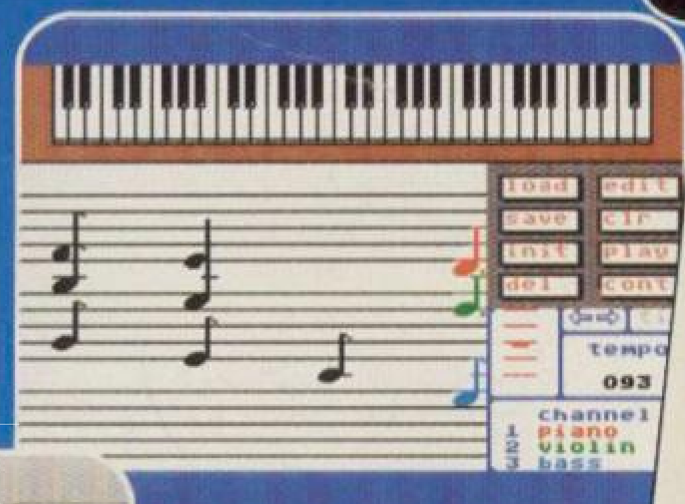


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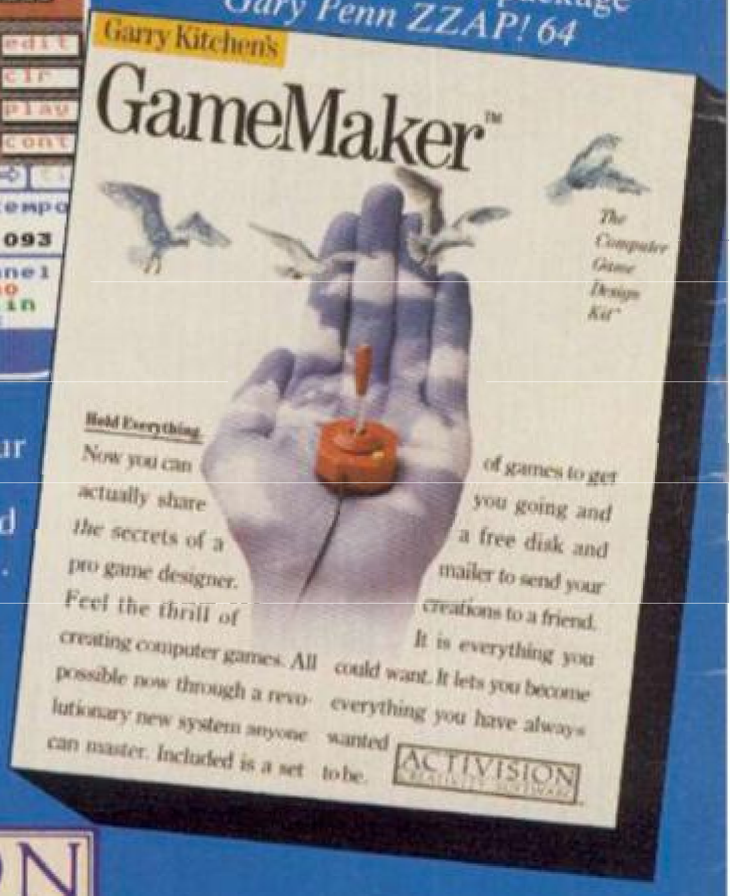
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STF REVIEW

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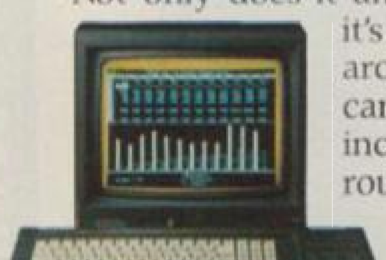


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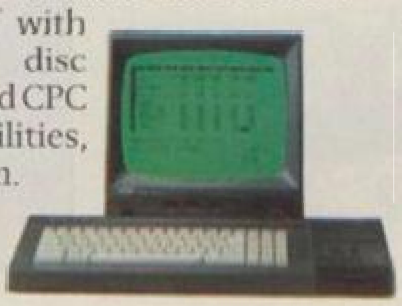
No wonder people are racing out to buy Amstrad's new CPC 6128 computer.

Not only does it answer all your business needs,



it's also compatible with nearly 200 arcade and adventure games. So it can either speed you through your income tax returns or whizz you round a simulated Silverstone.

On the business side we start you off with a free disc



which introduces you to the Amstrad CPC 6128's impressive range of capabilities, and the best ways to exploit them.

You'll discover how its massive 128k memory can open the door to over 8,000 CP/M* applications.

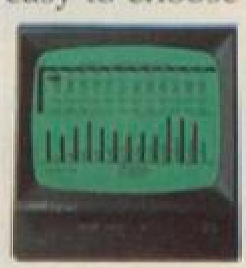
Programs like 'Wordprocessing' and 'Database' will file and index records, produce standard letters, mailing



lists and even compile reports.

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In other words it's easy to choose the software you need to take the big problems



out of your small business.

But even if you don't own a business there are plenty of good reasons for owning an Amstrad CPC 6128.

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However even software packages as comprehensive

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wordprocessing and 180mph.



as Amstrad's are only as good as the hardware they're loaded into.

You need a complete system.

That's why the Amstrad comes complete with a built-in disc drive as well as a monitor (green screen or full colour). So it's ready to go to work as soon as you get it home.

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IT HAS BEEN just over a month since the Spectrum 128K was launched, sufficient time for some considered opinions regarding the machine to have been formed. The verdict on its specification varies considerably, depending on who is being asked but a number of clear points emerge. The first is that the majority of people think that at £179.99, the machine is over-priced. The second is a universal surprise that Sinclair chose not to build in a joystick port. The much-quoted market research Sinclair undertook before finalising the design of the 128 seems to have highlighted attitudes to the requirements of a games machine which are at odds with the conventionally-perceived needs of this sector of the market.

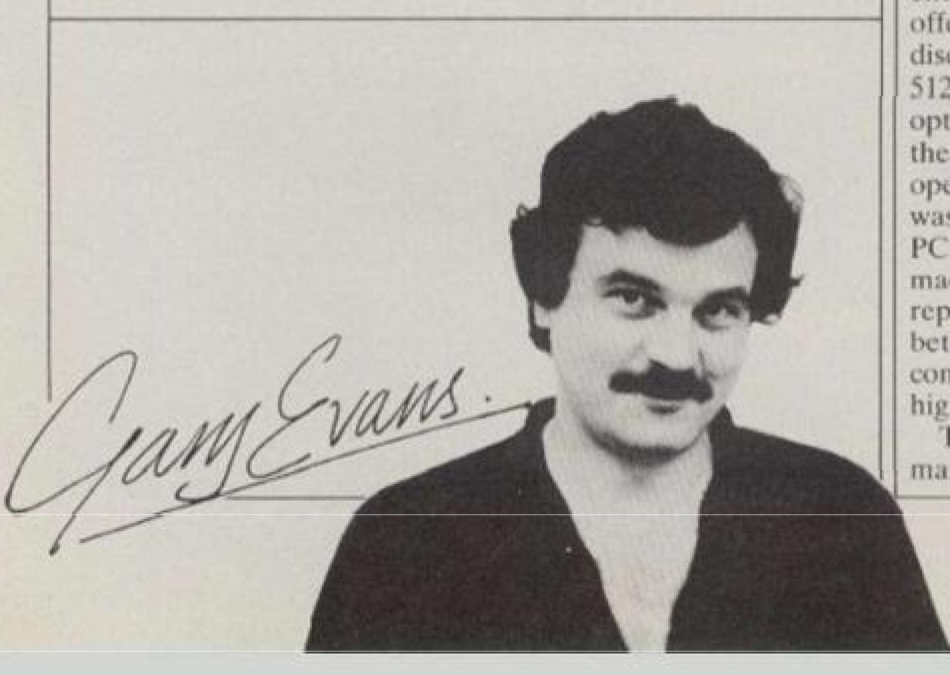
Some industry sources expect that, by this autumn, Sinclair will abandon the existing Spectrum Plus, or at least reduce its price to less than £100, and re-position the 128 at a price of slightly more than £100. At that price the 128 would be good value and the computer would be well-placed for the 1986 Christmas market, particularly against the plethora of 16-bit computers which will be around at that time.

Until such a move gives a boost to sales of the 128 it is unlikely that software houses will devote too much time and programming effort to producing programs for the machine in 128 mode. About the only extras which will appear will take advantage of the sound chip of the 128 to provide more tuneful offerings. Perhaps there will be a few more screens in some games but much 128 software will not offer little more than a 48K version of the same product.

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IBM to launch sub £400 PC?



The embarrassing IBM retreat from the home market with its ill-fated PC Junior machine dragging between its corporate legs is now reckoned to be one of the classic cautionary tales for computer companies.

Now there are rumours which suggest that Big Blue will have another go at the low-end of the computer market. The giant is expected by some industry watchers to announce an sub-£1,000 machine based on its Japanese IBM JX computer.

The JX was released in Japan and Australia late last year as the IBM Japan entry-level computer system, offering dual 720K 3.5in. Sony disc drives, between 64K and 512K of RAM, infra-red option on the keyboard and the Intel 8088 processor operating at 4.77MHz. There was also talk of IBM PC and PC Junior compatibility for the machine, although IBM's reputation for compatibility between its different makes of computer has always been highly suspect.

There have, or course, been many previous speculations about IBM moving to a cheaper machine with 3.5in. discs, notably the rumours last summer of an 3.5in. disc-based IBM PC II, which were so strong that IBM for the first time in its history had to break its policy of not commenting on machines it had not released to quell the speculation.

The market was so convinced that IBM was about to release the machine that orders for its existing PCs began to slow and that is one of the few events which can move the often-lethargic company into action.

The other school of thought suggests that the mooted IBM move into the low end of the PC Market may be an attempt to squash the growing number of cheap clone manufacturers which have brought the price of a basic unexpanded single-drive PC down to about £600. By offering its own low-end machine, the company may be thinking it can divert attention from the cheap compatibles and get back to the basic PC market it has been losing in recent times.

Herman Hauser moves to top Olivetti post

Life at Acorn will never be the same. Announcements from the company's majority shareholder Olivetti revealed some startling new insights as to what the Italian giant wanted from the people who introduced the BBC Micro and the Electron.

In the last few weeks, Olivetti has offered Acorn the chance to sell its new £1,500 IBM-compatible workstation to schools. The new Olivetti M-19 – and the specially-designed Classnet educational networking system which goes with it – will form the basis of the Olivettis push into the European education market. Acorn has been offered it to supplement its range of successful BBC machines in British schools. So far as we know, the offer has not been accepted.

It has hired Acorn co-founder Herman Hauser as the company's director of advanced research. Hauser will be moving to Italy soon to take up the appointment.

It has given up on the BBC in Europe. The advent of the Olivetti M-19 system for use in European schools means that it will no longer be promoting Acorn machines on the European continent. Senior management at Olivetti told a gathering of journalists in Venice that it thought the Acorn offerings were "too expensive" and that the use of a proprietary operating system limited flexibility. After the statement, there were private rumblings from U.K. people who originally supported the Olivetti rescue of Acorn on the basis that it would open European market for the BBC, rather than help in closing them.

The company declined to badge the Acorn Communicator series of computer-phones on the basis that it does not believe the market for such a machine is sufficiently firmly established to bother.

It is difficult to try to discover the Italian company's motives with regard to Acorn but from the frank way it is willing to criticise the company and at the same time leave it to refuse to carry new Olivetti products into the British education market, one can only assume that Olivetti is conducting a hands-off policy towards the company. It seems as if Acorn will continue to be allowed a good deal of autonomy.



The Force is with us

Arus Software has launched a police superintendent simulation game. In this £9.95 cassette offering for the Spectrum or Commodore 64, you play the part of police superintendent of Middletown and must control the units in your police division. To do so, you can use four police stations, a variety of beat officers, police dogs, police horses, a community liaison officer and even a crime prevention officer. For those wanting to sign for the latest in electronic crime-bashing, contact Argus and ask about *The Force*.

Growth in computer market confirmed

In the warmer days of April it is difficult to conceive that the financial boffins of the computer industry were still poring over the Christmas sales figures until a few weeks ago.

Sinclair is claiming victory in the Yuletide sales battle as it quotes Audits of Great Britian surveys which show that it garnered 37 percent of the market for home computers for the whole of 1985. The company was also citing the Sinclair Spectrum Plus as the biggest-selling home computer in the U.K., alone accounting for one in three of all computers sold for less than £500.

Company representatives suggest the figures also show that the home computer business is bouncing back. 'Both our market research and independent tracking studies from companies like AGB indicate that low-cost computers for entertainment use are by far the biggest segment of the home computer market and offer the best potential for future growth.

PCW comms pack

Comms has reached the Amstrad. Long-time business communications software supplier Sagesoft announced last month that it was releasing its Chit-Chat IBM PC communication package for the Amstrad PCW 8256. The software is being offered in three versions – Viewdata, E-Mail or Viewdata/E-mail combined; the first two cost £69.96 each, while the pack combining both costs £99.95. Sagesoft is also offering the modem and cabling hardware together for £199.95 when sold with either Viewdata or E-Mail software or £249.95 when sold with both.

The package features true monochrome Prestel graphics on the PCW8256 and the new PCW8512.

ST software now on-stream

The new brace of Atari ST computers was launched alongside announcements of a collection of third-party emulation products which should bring out the chameleon in all of us.

Not content with having an input system – GEM – which looks very like the Apple Macintosh, Atari revealed that a third-party hardware developer is about to release a £300 hardware add-on which will let the ST emulate an IBM PC. The IBM emulator will include a 5.25in disc drive, 512K of RAM, and Atari says it hopes the new device will be available by early summer.

Also promised is a Macintosh emulator which allow ST users to buy off-the-sehfl Apple Macintosh software and run it on the ST and a version of CP/M which will open the vast base of classic business software to ST users. Prices and availability for the latter two products have not yet been announced.

The question remains, however, whether or not ST users want those emulation products or new operating systems; many want more software they can use with the ST under its own operating system, TOS. Atari says that more than 100 packages are now available for the ST under GEM.



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plus Logo programming languages, a word processor and drawing programme, yet costs only £652* including disc drive and black and white monitor.

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MicroScope GALLUP

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AMSTRAD TOP 10

TM	LM	Title	Publisher
1	NE	Elite	Firebird
2	NE	Sky Fox	Ariolasoft
3	2	Yie Ar Kung Fu	Imagine
4	NE	Hypersports	Imagine
5	1	The Sold A Million	Hit Squad
6	3	Formula One Simulator	Mastertronic
7	6	Caves Of Doom	Mastertronic
8	5	Finders Keepers	Mastertronic
9	9	Who Dares Wins 2	Alligata
10	10	Spellbound	Mastertronic

TOP 30 OVERALL CHART

LM	TM	Title	Publisher
1	2	Yie Ar Kung Fu	Imagine
2	NE	Kung Fu Master	US Gold
3	6	Formula One Simulator	Mastertronic
4	12	Elite	Acornsoft
5	5	Winter Games	Epyx/US Gold
6	22	Hypersports	Imagine
7	10	BMX Racers	Mastertronic
8	1	Commando	Elite
9	11	Finders Keepers	Mastertronic
10	9	Action Biker	Mastertronic
11	NE	Rock'N' Wrestle	Melbourne House
12	NE	Eidolon	Activision
13	3	Rambo	Ocean
14	NE	Movie	Imagine
15	8	Computer Hits (10)	Beau Jolly
16	5	They Sold A Million	Hit Squad
17	13	Spellbound	Mastertronic
18	NE	Barry McGuigan World Champ	Activision
19	NE	One Man And His Droid	Mastertronic
20	18	Big Mac	Mastertronic
21	15	Rockman	Mastertronic
22	RE	Lord Of The Rings	Melbourne House
23	23	Caves Of Doom	Mastertronic
24	30	Vegas Jackpot	Mastertronic
25	7	Way Of The Exploding Fist	Melbourne House
26	16	Now Games 2	Virgin
27	19	Mercenary	Novagen
28	28	Steve Davis Snooker	CDS
29	RE	Chiller	Mastertronic
30	20	Tutti Frutti	Mastertronic

COMMODORE TOP 10

TM	LM	Title	Publisher
1	NE	Kung Fu Master	US Gold
2	NE	Yie Ar Kung Fu	Imagine
3	6	Rock 'N' Wrestle	Melbourne House
4	NE	Eidolon	Activision
5	7	Mercenary	Novagen
6	8	Kane	Mastertronic
7	NE	Desert Fox	US Gold
8	5	Koronis Rift	Activision
9	2	Commando	Elite
10	3	Winter Games	Epyx/US Gold

SPECTRUM TOP 10

TM	LM	Title	Publisher
1	NE	Movie	Imagine
2	2	Winter Games	Epyx/US Gold
3	5	Spellbound	Mastertronic
4	NE	Barry McGuigan World Champions	Activision
5	1	Commando	Elite
6	4	Yie Ar Kung Fu	Imagine
7	3	Rambo	Ocean
8	NE	Hypersports	Imagine
9	NE	Caves Of Doom	Mastertronic
10	NE	Gunfright	Ultimate

BUBBLING UNDER

Kung Fu Kid	Gremlin Graphics
Desert Fox	US Gold
Sky Fox	Ariolasoft
Back To The Future	Electric Dreams
West Bank	Gremlin Graphics
Thai Boxing	Amco
Who Dares Wins 2	Alligata
C16 Classics 2	Gremlin Graphics
Yabba Dabba Doo	Quicksilva
ZZZZZ	Mastertronic


4
ZZAP! SIZZLERS FOR YOUR CBM 64/128
ZZAP! Sizzlers
WHO DARES WINS II
Only the bravest volunteer for the ultimate suicide mission to free lost compatriots held prisoner by the armies of death, the forces of oppression. Only the fearless dare take up a challenge where courage and endurance are as essential as intelligence and skill. Compulsive. Action packed. Step forward, modern day hero, you'll never know how good you really are until you've tested yourself on the ultimate mission.
DROPZONE
It's the year 2085. Only a handful of people have survived the robot wars that rocked the Solar System. In a final desperate bid for survival a Tacheon propelled star cruiser has been developed on Earth to transport survivors to a new star system. But the cruiser relies on rare Ionian crystals for its power, crystals which are only abundant on Jupiter's second moon Io. It is your mission to escort the men and their precious crystals safely from the surface of Io to the Dropzone where the landing pad is located.
WIZARD'S LAIR
Tis a legend told long ago
About dark caves far down below.
Where deep within a Wizard dwells,
Bespeaking doom and casting spells.
If this lair thou dost uncover,
Four pieces of lion thou must discover.
Only then may you escape
Past the lion that guards the gate.
So heed this warning and beware
Never venture into 'Wizard's Lair'.
THING ON A SPRING
The evil goblin's wreaking havoc on an unsuspecting world, casting spells and banishing its treasures to his underground factory deep in the bowels of the earth. How can he be stopped? What can we do? Who can do it? There's only one saviour – our hero – Thing on a Spring. Complete the magical jigsaw and break his fiendish spell.
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Thing on a Spring
ALIEN 8
Long long ago ... in a distant galaxy, on a distant dying planet, the last of the guardians prepare their starship for its final journey. All of the libraries, records and knowledge have been stored aboard the vessel, along with the very best of their cryogenically preserved race. The planet's final end draws near as the last, most vital piece of equipment is loaded aboard, activated, and the hatchways closed. The ULTIMATE evolution ALIEN 8 cybot whirrs into an artificial cybernetic rush of intelligence.
All hatchways are sealed, as the starship prepares for its long uninterrupted journey into the inky void of space.
SPY HUNTER
The official home version of Bally Midway's 1st arcade hit.
• You control the turbo charged race car/hydro spy boat.
• You control a deadly arsenal of missiles, machine guns, oil slicks and smoke screens.
• Sophisticated spy-challenging graphics.
This is hardly a game. It's a high-speed test of your secret agent skills. Meet the challenge and survive Spy Hunter!
SEGA
DUN DARACH
It happened that, following a fateful, bloody and largely pointless battle against the Conachta, Cuchulainn the Great was returning home to Muirmethne in company of his faithful charioteer, Loeg; pointless because the enemy was a scouting party and not intent on taking the peak of Beann Ghulban, below which the battle took place; fateful because, amongst their number was Amhain, a Prince of the Conachta and the darling of his father, who vowed an instant revenge.....
NIGHT GUNNER
The air battle where only aces survive! Each of the 30 different missions pushes you to the limit with enemy fighters attacking from all directions, guns ablazing! – explosive 3D ground attack sorties, and there's still the flight home.
4
CRASH SMASHES FOR YOUR SPECTRUM 48K
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TAPES £9.95
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Night Gunner
Dun Darach
Alien 8
Gremlin Graphics Software Ltd., Alpha House, 10, Carver Street, Sheffield, S1 4FS. Tel: (0742) 753423.

Gremlin show the way with 'Tiger

The best animation on any fight game is what you get with *The Way of The Tiger*, the latest release from Gremlin Graphics, which should be smashing its way to the top of the charts any day. Released on the Spectrum and Amstrad, it takes the kind of cartoon graphic animation first seen in the Melbourne House *Fighting Warrior* and blends it with a fascinating scenario.

The game is in three parts – unarmed combat, pole fighting and Samuri sword fighting. It follows the plot of the books where you are a novice Ninja, trying to make it as a big-time Samuri. This trilogy of games is in itself part of a trilogy of releases, each based on one of the books in the series.

Four people have been working on the project for seven months and the result is a game of breathtaking beauty and complexity. Scrolling is on three levels, the foreground, middle and background, and the fighters are graphically very detailed. The animation of the fighters is highly flexible – the Ninja in part one has more than 70 frames of animation. Where the game scores over *Fighting Warrior* is in the large number of different attacking and defensive moves you can make and in the intelligence of your opponent.

The computer opponent's moves are based on a number of factors – what you are doing, how weak you are and how weak he is. Both you and your opponent have a large amount of endurance – or inner strength if you prefer – which is whittled away in the fight. If you succeed in defeating him, you are given more inner strength to go to the next battle. All you then have to do is get through a dozen or so such battles to proceed to the next scenario; get through all three scenarios and you have made it – simple really.

Not content with cornering the games market, Gremlin is also seeking a slice of the action in the Amstrad utility market. "I think there is a big market for serious applications packages; it is just that so far the marketing has been all wrong," according to Ian Stewart, Gremlin marketing manager.

The first release is *Pyradev*. At £29.95, it is on disc only and features an editor, assembler, monitor a disc nurse and some utilities. The assembler features a linker, so it can handle very large files, and it also has a help mode to teach basic machine code procedure. Two other products in the Discovery range are *The Animator* and *E.M.U.* The Animator is a program which can help you to make cartoons. You draw the first and last frames, and the program works out the frames in between them to produce a smooth, moving image.

E.M.U. is a music package. "Obviously this is competing head on with the Rainbird *Music System*, says Stewart, "but the difference is that E.M.U. can be incorporated into your program. This is the idea of the Discovery range. It is not a series of stand-alone programs but a series of programmers' aids to help the user write better programs."



Dr Who on the CBM 64

Dr Who and the Mines of Terror arrives for the Commodore. Priced at £11.95, it was due on March 19. The game was not a big hit on the BBC when it appeared late last year but that was, so Micropower hopes, was due to the high price, caused by its split ROM/tape presentation.

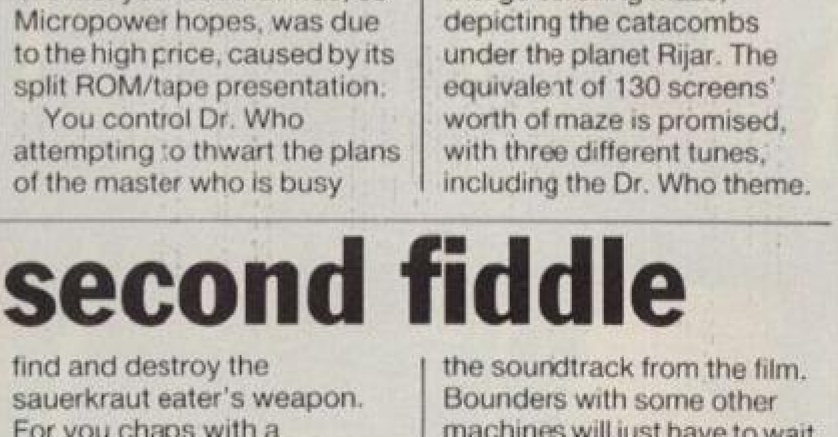
You control Dr. Who attempting to thwart the plans of the master who is busy constructing a time instant replay unit. You would have thought he would have borrowed one from The Big Match and save himself the trouble. The game consists of a large scrolling maze, depicting the catacombs under the planet Rijar. The equivalent of 130 screens' worth of maze is promised, with three different tunes, including the Dr. Who theme.

Biggles plays second fiddle

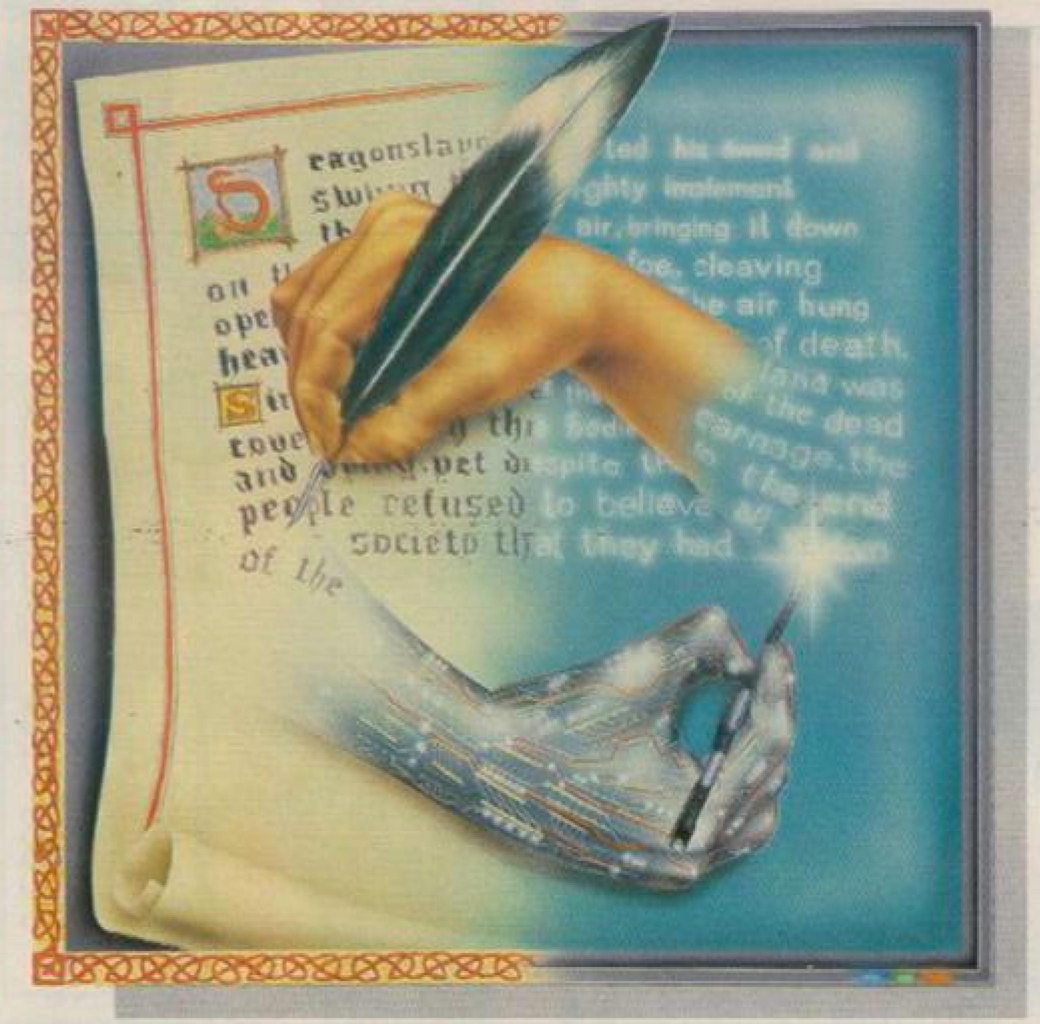
I say, ginge, what ho, we're a computer game! Those jolly chaps from Mirrorsoft have jolly well bought the rights to the computer game of the dashed old film coming soon. What it is, you see fellows, is that the dashed Bosch has a secret weapon which fries people faster than you can say 'Zeppelin'. So me and my three brave chums have to go and sort it out, or it could change the whole course of history.

Well, this is the kind of thing I should be able to polish off in a fairly heavy morning's work and still make it back to base in time for tiffin; but then the plot goes up the kybosh and some damn American keeps turning up. Apparently, the game follows the film, and you do not get your money back on a film unless you can sell it to the States, hence the American star, and your old chum and megahero gets pushed into the co-pilot's seat. Dash it all, the American bounder even gets the girl.

The jolly old game had several parts which show the various dashed clever things me and my chums get up to to find and destroy the sauerkraut eater's weapon. For you chaps with a Commodore, the game is due at the beginning of May, with the soundtrack from the film. Bounders with some other machines will just have to wait a little longer, so tally ho.



THE WRITER



"The Best"

When it came to reviewing the best in wordprocessors for the Spectrum, Your Sinclair (Jan. 1986) said "I have no doubt that 'The Writer' will take over as the best Speccy wordprocessor."

Praise indeed. But praise we think is warranted for what one industry pundit described as "Probably the best wordprocessor I've seen for any Z80 based micro."

Just look at these professional features: up to 127 column screen display; Wordstar* compatible; Tasword II compatible; true printer spooling; user definable printer definition files (works with virtually any printer which can be interfaced to a Spectrum); pull-down menus; extensive 'help' files on non-tape versions; mail-merge (works with 'The Database' – forthcoming); print-merge; enables the definition of variables and numeric expressions in text; 48K and 128K Spectrum versions; Mouse/Joystick pointer options coming.

'The Writer' – "Simply, the best wordprocessor for the Sinclair Spectrum."

SOFTECHNICS

SofTechnics, 12/13 Henrietta Street, Covent Garden, London WC2E 8LH.
Tel: 01-240 1422/7877. Tlx:892379.
Write for details of "The Database" and "The Spreadsheet" coming soon.
(The Writer and Artist II are available on most formats – disk, Microdrive and tape).

*Wordstar is a registered trademark of MicroPro.

THE ARTIST II



"Better than the Best"

When we launched 'The Artist' in 1985 it was reviewed as the most amazing graphics package to have appeared for the Spectrum. Indeed, it became one of those very few 'utilities' to actually get into the Gallup Chart…

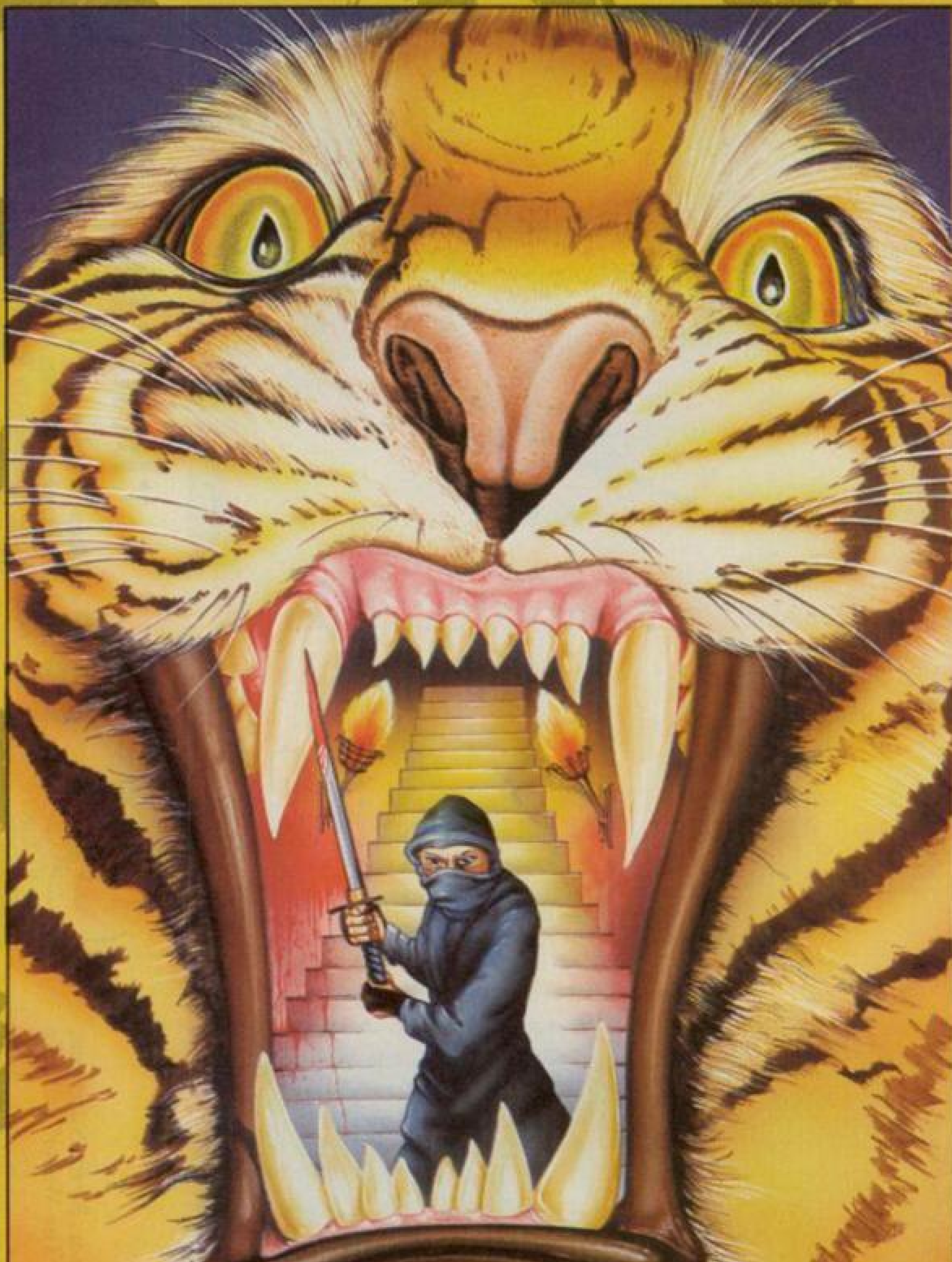
But now a new graphics package is all set to knock 'The Artist' off its Number One spot – 'The Artist II.'

Artist II has been designed to be the 'best-bar-none' with features including: Icons and Pull-Down Windows; Mouse Control Options (works with four different kinds of mice); 48K and 128K Spectrum versions; same unbeaten line up of graphics features – but now with the addition of elastic-lines, elastic-circles, elastic-elipses and elastic boxes. Artist II now supports a full range of printers and enables 'dumps' in a variety of sizes. And yes, like Artist I, Artist II is still the only graphics package of its kind with a fully flexible 'cut & paste' facility for any shape of graphics.

PAGE-MAKE-UP: Artist II will also allow 'The Writer' files to be merged in and enable you to do true 'page make-up' as on much more expensive micros. Ideal for club/school magazines, broad sheets, etc, etc.

'The Artist II' – "It's bettered the best."

THE WAY OF THE TIGER



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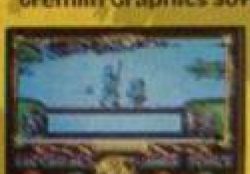
Cassette £9.95

Disc £14.95

MSX 64K Spectrum 48K Amstrad CBM 64/128

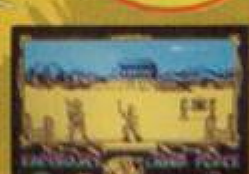
Gremlin Graphics Software Limited, Alpha House, 10 Carver Street, Sheffield S1 4FS. Tel: 0742-753423





TRIPLE-SCROLL





Screenshots from Spectrum 48K

New Version of Locoscript

Locoscript V1.0, as supplied with the Amstrad PCW8256 from the day of launch, was a remarkably bug-free piece of software. The most notable problem with the first version of the word-processing package was the fact that it was not possible to enter the code required to produce automatic page numbering as part of the header or footer of a document. A few users must have become more than a little frustrated with the system's steadfast refusal to accept page number codes, the only solution to the problem being to edit the footers in one of the supplied template files.

Amstrad has resolved the page numbering bug with version 1.2 of Locoscript and at the same time has built-in some other facilities which add to the versatility of the package. The first of the additional facilities comes into play when selecting the print option from the main disc manager screen. The new print option menu features a command which allows the user to select between a print-all-pages option, the only choice in V1.0, or a print from page number to page number selection. The ability to print selected parts of a document is a valuable feature, particularly when working with documents of any length.

The second addition to the repertoire of Locoscript commands is again accessed from the main disc manager screen, this time via the f7, options selection. A new facility is added to the selections which appear in the pull-down menu which appears when that option is selected. The option allows users to create an ASCII text file from a document created under Locoscript.

The create file option provides a further choice; either make a simple ASCII file in which all control codes and padding spaces are stripped and an option to make a page image file in which the layout of the original document is preserved, though again all control codes are stripped from the file. The ability to create such ASCII files is vital if the PCW8256 is to be used, in conjunction with suitable software, as terminal for electronic mail.

All documents created under the original version of the software will run under V1.2; the new commands can also be applied to documents created under V1.0.

Any users of the PCW8256 who still have version 1.0 should send back their original system discs to Amstrad, which will supply the new version of the software free.

Firebird Revamp Silver Range

Firebird looks set for a busy spring as it revamps its Silver range of software and undertakes the marketing of Odin software.
deserved." The first batch of games from the link between the two companies is due in late spring.

The new Silver range releases will cost £1.99 and, One of the titles is *T-Base Delta*, described as *Sub Sunk part II*, a graphic adventure. *Spiky Harold goes Hibernating* is all about collecting food ready for hibernation, the first computer game where falling asleep is the objective rather than the effect. *Olé*, by the author of *Chicken Chase*, is, not surprisingly, all about bull fighting but, falling into line with EEC guidelines, we are promised no blood.

Cauldron II – The Pumpkin Strikes Back

If *Cauldron* kept you stirring late into the night, *Cauldron II* could be just the potion for you. Palace Software has been quiet since the release of Cauldron, but all this is set to change. It has employed more staff and now plans four releases this year. Cauldron II, subtitled The Pumpkin Strikes Back, is the first mainifestation of the new onslaught.

The game starts where Cauldron left off. At the end of Cauldron, you, as the witch, had managed to get all the keys, mixed the six ingredients, and conquered the power of the Pumpkin. In Cauldron II, you undergo a stronge transformation and become the Pumpkin, intent on revenge by cutting the witch's hair. You move the Pumpkin by bouncing – how else?. You can work up your amount of bounce and also bounce left or right. So far so good, but if you bounce off an object not just as you intended, you can go completely out of control.

The good news is that you can fall as far as you like without becoming so much pumpkin paste. The bad news is that the hag's castle is more or less packed with spikes, flames, grasping hands, spiders, hunchbacks and knights. You have to collect six magic objects to complete your task. Game play is very complex, although Steve Brown, the author, promises it is easier than Cauldron. "We had to make it simpler than Cauldron because, so far as we know, no-one ever managed to complete the last game.
We thought we had to make it difficult – the children were really getting so good they needed a challenge so I suppose we overdid it a little.

The game has 128 screens and features some superb graphics, including animated gargoyles, which make this game far more than just a sequel. It is due on May 23 for the Commodore; Amstrad and Spectrum versions will follow about a month later.

Some other games on the starting-blocks at Palace are *Sacred Armour of Antirad*, an arcade adventure very much in the story board stage at the moment, and a tropical escapade written for Palace by a new company Binary Vision, which was formed by two ex-members of the Electronic Pencil.

Charity Begins At The Home Computer

From war among the planets to War on Want. Not some inter-galactic struggle but something much closer to home. Fighting poverty in the Third World may not seem a good plot for a computer game but it is the idea behind a new charity tape.

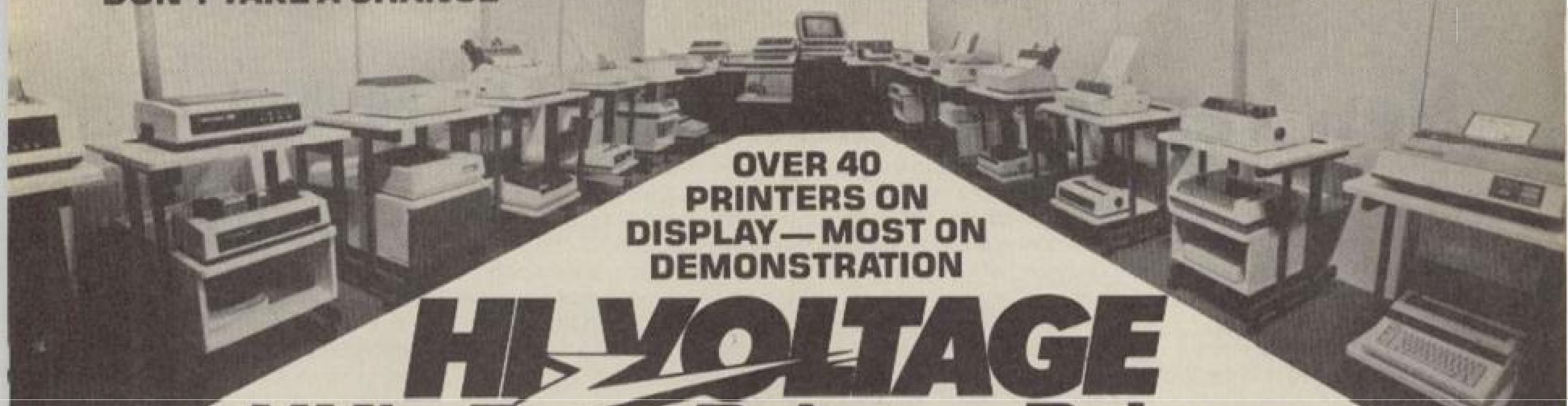
WOW Games contains 14 titles for the Spectrum and costs £9.95. The compilation is headed by *Rupert and the Ice Palace*, a previously-unreleased arcade adventure from Quicksilva. Another major attraction is *Hunchback II* from Ocean, one of last year's big hits. Commenting on the line-up, Toby Robinson, the man behind the WOW tape, says:

"Some of them may not be the greatest titles on earth but they are all very playable and it represents excellent value. We also like *Pedro*, which has a Third World theme about tending crops and keeping up the food supply."

The money raised from the tape will go into the War on Want general fund, which aids projects in the Third World aimed at increasing self-sufficiency, food production, better health and education. The tape initially will be available only by mail order direct from War on Want from April 21 onwards, telephone 01-403 2266. The compilation should reach the shops soon after that.

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Amstrad Launch PCW 8512 System



From the end of March the Amstrad PCW8256 will face some stiff competition. Alan Sugar will lose no sleep over this news though as the machine that could challenge the 8256's success in the word processor market is another Amstrad machine, the PCW8512.

The 8512 will sell for £499 + VAT, that is £100 more than the 256K machine. For this extra money, the new machine offers all the features of the 8256 plus and extra 256K of RAM and a second 720K formatted second disc drive.

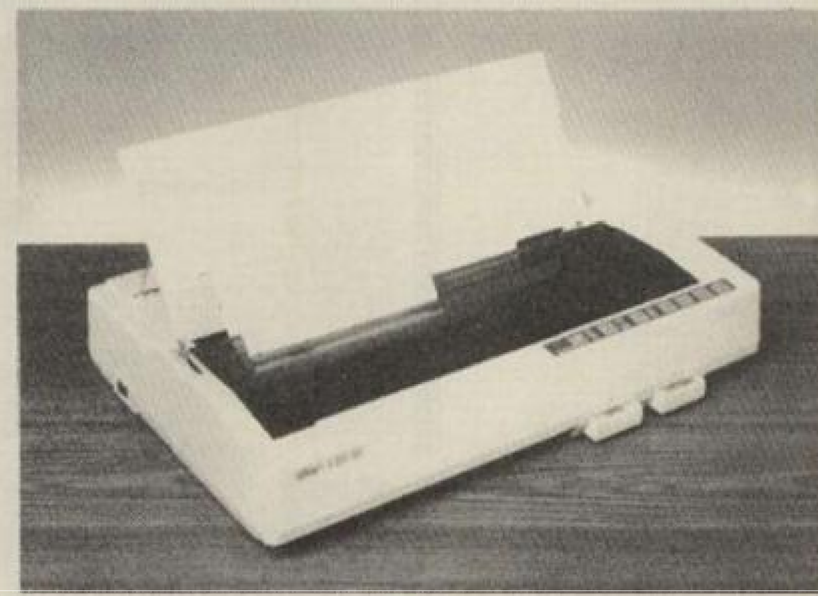
The inclusion of a second drive will mean an end to the tiresome disc swapping that is so often necessary when using the 8256 with Locoscript and third party software.

The extra memory will also add to the machine's ease of use as the capacity of the RAM disc is now 368K. Using the RAM disc as the working drive when editing documents or using spreadsheets will greatly increase the speed of operation as disc access times – so often a bottleneck in processing operations – will be virtually instantaneous.

Those who had been considering the purchase of an 8256 should seriously consider selected the 8512 as the extra £100 spent on the computer is well worth it.

Meanwhile, 8256 users who want an extra drive should contact their nearest Amstrad dealer for details of the official conversion pack.

New Printer From Star Micronics



Following the launch of its 24-pin, high-speed letter quality printer, the NB-15, Star Micronics UK have introduced the next model in the 'N' series. Replacing the current SG-10 and SG-10C models, the NL-10 incorporates many advanced features first seen on the NB-15 despite costing just £278 for a parallel version or £318 in serial form.

Using a conventional 9-pin head the NL-10 runs at 120cps in draft mode and offers 30cps in Near Letter Quality. An italic font has been added to the NLQ mode, except on the IBM versions where the alternative character set is used. Up to 96 user defined characters in either draft or NLQ format can be downloaded on all models except the Commodore version. Alternatively the 5K buffer can be used to hold text and so reduce the amount of time needed to transfer the document from the computer.

Virtually all the printer's main functions are now controlled from a set of touch switches. These allow the user to select the font, pitch and style required, set the left and right margins and perform forward and backwards microspacing of the paper. All the functions can also be controlled by software while the default settings are set up on easy access DIP switches.

With its modular interface the printer can be moved from one brand of computer to another by exchanging a cartridge at the rear of the unit. This can be done by the user at any time, a single screw holds the cartridge in place. Interfaces for IBM, Apple and Commodore plus the usual parallel (Centronics) and serial (RS232) will be available straight away with further modules being introduced later.

Additional features provided by the NL-10 that were not available on the SG models include semi-automatic single sheet loading. All the fonts can now be printed in a headline mode which offers both double and quadruple height text.

Trainer

While on the subject of Amstrad's PCW computers, if you, like many others, find the manual describing the operation of the Locoscript WP software to be incomprehensible – fear not, help is at hand. For £10 the Velda Training and Secretarial Services agency will send you a guide to word processing on the 8256 which is written in plain-easy to understand-language.

Send your order to 1 Landseer Road, Westbourne, Dorset, BH4 9EH.

When is a Spectrum not a Spectrum?



The answer to the question above is – when it is a Microdigital TK90X. This machine, described as Spectrum compatible, has recently gone on sale in Brasil along with a series of commercial programs, most of which are pirate versions of British Spectrum programs.

Teletel – Prestel's International Rival

If a Frenchman wants to find someone's telephone number, the chances are he will not reach for the telephone directory. Instead, he will probably key the name of the person he wants to call into a terminal next to his telephone and the number he needs or, if the name is a common one, a list of alternatives, will be displayed within seconds. The system is called Teletel and internationally it looks as if it will become a serious rival to Prestel.

The terminals are known as Minitels. They look like small monitors, about 10in. to a side, but a hard cover over the screen folds down to reveal a built-in keyboard.

Nobody has to buy one; PTT, the French telecommunications authority, gives them away instead of a telephone directory. Lastest estimates are that about 1.5 million have been installed and numbers are growing at the rate of one million a year.

Electronic 'phone book

In itself the *Annuaire electronique* presents no direct threat to the standing of Prestel, though what micro user in the U.K. would not love to own one? but it is being used to create an enormous user base for Prestel-style services. Every household using the electronic telephone book also has access to hundreds of independent databases on the same network.

Using Teletel is much like using Prestel. You call the computer on the telephone and hit the on-line key when you hear a whistle. Then comes the first surprise: no user ID, no passwords.

About half the databases on Teletel are openly accessible to anyone; there is no subscription. The caller is charged for the time he spends on the system by adding the cost to the bill for the telephone he is using – it costs about 10 pence a minute. Some sections are for closed user groups – those inteded for lawyers and doctors, for example – but the system as a whole is wide open.

From the Welcome frame you enter the service of your choice by keying-in its name. Like Prestel, Teletel is page-based but Minitels, unlike the original Prestel sets, all have alphanumeric keyboards, so Teletel is free of the tyranny of page numbers. You move within the domain of each information provider using a combination of menus and keywords.

The only snag with this approach is that crossing between databases is difficult. To clamber from one "tree" to another you have to return to their common root at the Welcome frame and start again.

Fortunately, the Minitel has several dedicated keys to simplify the process. One returns you to the local menu, another takes you directly to the Welcome frame, and a very useful Guide key provides an instant explanation of whatever service you are using.

Visually, Teletel and Prestel pages have much in common. Both use similar chunky graphics, though the French system is capable of drawing lines as well. On both systems it takes several seconds to display a page but Teletel gives the impression of greater speed, because frames are seldom re-drawn in full. The original page remains on the screen, while sections of it change.

Many of the databases are small, dealing in specialist information like weather forecasts or micro news, but the larger ones provide a range of familiar services.

Variety of services

Gretel, to take one example, has 85,000 pages of information organised into more than 400 programmes or local tree structures. Subjects range from news and sport, through consumer advice and education to small advertisements, contact pages and, of course, the inevitable games and quizzes.

There are also several message services. The poste restante is much like the Prestel Mailbox and you have to register to obtain a box number, but you can exchange messages with anyone who is on line at the same time by logging-on with a "pseudo" – or nickname – at the beginning of the session.

There is even a Gretel "chatline" like that of Micronet, on which everyone's messages scroll up the screen as they are entered and you add your own remarks to the general pandemonium.

Numbers to dial

One service conspicuously absent is telesoftware, though that this is scracely surprising, as only a minority of users access the system through their personal computers.

Teletel can be accessed by dialling direct from the U.K. – a cheap rate call costs £1.08 for three minutes. Do not expect it to work properly with Prestel software – the two are only partially compatible – but anyone rich enough to experiment can try the following numbers: 01033 36 19 91 11 – for the "electronic directory"; 01033 36 13 91 55, 01033 36 14 91 66, 01033 36 15 91 77 – each of these three numbers will connect you with Teletel; most of the "fun and games" databases are on the 77 line.

Of course, it helps to be able to read French.

IT, Comms and Tandata

I.T. (Information Technology) will be the basis of much of our future industry and British schools are now moving into the second stage of I.T. thanks to the Department of Trade & Industry and Tandata.

The first stage was the provision in schools of microcomputers. Most school leavers are now familiar with micros and what they can do. The second element of Information Technology is communications. Tandata's Tm512 'smart' modem has been chosen as one of the two modems to be offered to all secondary and middle schools as part of the Department's Industry year programme.

According to Brian Kingsmill of the Department of Trade & Industry, the Tm512 was chosen because of its proven track record in educational establishments (it is also supplied by the Times Network for Schools), its reliability and its ability to work with software used in schools.

Tandata's Managing Director, Roy Pendleton, says: "The funding by the DTI of modems give schools the opportunity to get to grips with one of the main growth areas, and one in which Britain has a world lead. Schools can access prestel, electronic mail services, the Times database, or they can transfer data or even computer programs from one micro to another – even if that micro is in another part of the country or overseas."

The V21/V23 Tm512 operates at 300/300 bps; 1200/75, 75/1200 and 1200/1200 half duplex. It will auto dial and auto log on including via PSS, simplifying the sometimes lengthy log on procedures to a single key function.

Alligata puts the bite on with a bunch of snappy titles

Lee Paddon travels to the primaeval swamps of Sheffield and finds that Alligata is preparing a surprise attack on the top of the charts; secret weapon: Tony Crowther.



The Alligata team: from left to right, Pete Frith, Tony Crowther, Ross Goodley, Dave Palmer and John Stevenson.

When John Mahoney met me at the station in his sleek Mazda sports car he quipped: "Welcome to the people's republic of South Yorkshire." Here at least was one member of the Mahoney mafia who was not reduced to sackcloth and ashes. Snowbound Sheffield might seem an unlikely habitat for this reptilian sounding company. Worse was to follow, I found the rest of the outfit huddled round gas fires in partly-derilict offices behind a shopping arcade. "The heating has never worked properly since the firm downstairs moved out," explained Mahoney.

It all started in August, 1983 when two schoolboys walked into Superior Systems, a shop run by two brothers, Mike and Tim Mahoney. Their names were Tony Crowther and Steve Evans and it did not take long for the Mahoneys to recognise a meal ticket when it looked at them. So they formed Alligata to sell Crowther's and Evans' games. John joined the business later.

New projects

Perhaps most people remember Alligata best for *Blagger* and *Blagger goes to Hollywood*, both Crowther games. Then Tony left for a better-paid job with Gremlin. Since then, Alligata spent some time in obscurity until *Who Dares Wins* and *Who Dares Wins II* from Evans. Now Alligata looks set to build on that success. "We are very excited about the programmers we have now at Alligata," says Dave Palmer, the Alligata public relations man. "Crowther has rejoined us, with Ross Goodley and John Stevenson; we think it's a formidable team."

"The trouble with Goodley" according to John Mahoney, "is that he swears a good deal, no matter who is around, especially if you tell him he looks like Jeff Minter. He speaks six languages, including Russian, and has more degrees than a thermometer. When he gets into a game, he goes into a sort of catatonic trance – you never know he's there."

The game at present mesmerising Goodley is *Meltdown* for the Amstrad. It is about breaking into a nuclear plant and closing it before it blows. To do it you have to win a number of sub-computer games to outwit the control computer. One of them is called The President's Brain is Missing. You collect pieces of the brain against a time limit measured on the "nukes" scale at the bottom of the screen.

Beware of Bonzo, Ronnie's most famous co-star, and the bottles of Grecian 2000. The main game is a colourful 3D isometric shoot-'em-up. Having an Arnor assembler plugged-in helps but, according to Goodley, "It's not a bad machine – tried and tested components – but no design, a naff speaker, and the screen handling is really slow."

On the other side of the programmers' den, Stevenson was putting the finishing touches to *Ark Pandora*, a massive graphic adventure with 96 screens, 14 objects and 10 characters. If you manage to get through all those there is a screen designer kit to play with. In Ark you take the part of a murderous pirate, so you can kill and maim as you usually do in those games without feeling too bad about it.

Your aim is to escape from the island and the retribution you so richly deserve. The islanders give you a boat if you can free them from the evil tyranny of the Island's ruler, the High Priest of the evil cult. It sound as if there is a good name for a pop group there, which brings us to the subject of music. Ben Dalglish is the musician in residence at Alligata. He's part of We M.U.S.I.C. – we make use of sound in micros. The other half is Crowther, who wrote the package Dalglish uses to put his music on to games. During my visit Dalglish was playing with some digital Pan Pipes and a startling rendition of *Catchapya*, with a double guitar sequence of which he was particularly proud.

We can certainly look for some better sound tracks on Commodore games in the



future, as We M.U.S.I.C. will not be confining itself to Alligata games but seems to be fast cornering a good slice of the micro music market.

So what of Crowther, the *enfant terrible* of Alligata, who has returned, prodigal-like, after two years in the wilderness of other parts of Sheffield? "My mother complains that I move round too much but my brother has had six jobs in the same time. I left Gremlin when Geoff Brown joined and obviously wanted to run things. I like to be top cog," says Crowther. So he formed Wizard with Richard Taylor.

So why the return to Alligata? "I became bored with running a business. I want to get on with programming. If you take a break for two days, it takes ages to get back in to it. I am still tied up legally with Wizard, which means I can do nothing but sit around and be a celebrity."

So what can we expect from him in the near future? "I'm playing with a few ideas at the moment. I would like to write a version of Marble Madness. I got the bug after I watched a kid in an arcade playing the game for half an hour. Epyx has the rights, and there are so many clones around but I might do it for fun. I am also working on a split-screen, two-player, defender-type game. I am interested in doing something with inertia in it. I always start a game like that, write a special effect and then ask what it should be doing and build the game from that."

After almost three years, Crowther qualifies as one of the 'old men' of the industry and in that time has collected a fair number of heroes and villains in the Commodore community. "I like Paul Wokes' stuff. It's too mathematical for me but *Encounter* was so different. *Mercenary* was great, too, but I finished it in two hours. I like Jeff Minter's stuff, too. He doesn't aim for the general public and his routines are very weird. I wouldn't like to try anything like *Colourspace*. I don't like Braybrook games – *Paradroid* was dull, just shooting aliens, and *Uridium* is just like so many other arcade games, and that bit between ships is silly."

To try and disguise its blitz on the software industry, Alligata has set up two new labels. Rhino Marketing is for games like Ark Pandora, where no conversions are planned. Alligata games usually will be for a wide range of machines. There is also a budget label, Budgie, the assault being launched there by three games, *Labrynthian* on the Spectrum, *Disk Warrior* on MSX, and *Shoot-'em-up*, an arcade spoof, on Commodore and Atari. The competition had better beware, because the bite is back in Alligata.

WIN A COMMODORE C128D COMPUTER

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Last month, in an exclusive *Your Computer* review, we concluded that, with the arrival of the C128D, Commodore had found a worthy successor to the vastly popular model 64 computer.

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A C128D computer is the first prize in this easy-to-enter competition.



QUESTIONS

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2. *What is the model number of the in-built disc drive of the C128D?*
3. *How many K of ROM does the in-built drive feature?*
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It is not a fully-recognised fact that Sugar and Rice are useful components within the microcomputers of the 1980s but Amstrad Consumer Electronics plc is well aware of the effect on the company's products. The managing director, Mr. Sugar, and the finance director, Mr. Rice, have between them cooked-up a series of ideas which turned an already successful electrical goods company with a steady income into the runaway money-spinner which launched a thousand coronaries on the Stock Exchange and, incidentally, probably saved the British home micro industry from complete disaster.

If Sir Clive Sinclair started it all, it is surely arguable Alan Sugar has ensured its survival. The first Amstrad computer, the CPC 464, was not launched until 1984, by which time the gilt on the Sinclair gingerbread had well and truly rubbed off, leaving embarrassing gaps in the industry's self-confidence. The BBC micro was already dated and recogisably over-priced and comments about Acorn's lack of innovation were taking on an earnest, not to say desperate, tone. In fact, so nervous was the business world about micros that when Amstrad profits rocketed, as a result of selling 200,000 units of the CPC464 in the first six months after its launch, the Stock Exchange wiped several points off the value of Amstrad shares.

The panic did not last. The success of the CPC464 was founded firmly in the marketing strategy, which gave the consumer keyboard, monitor and built-in recorder as a standard package and introduced, for the first time, the concept of the instant computer – i.e., one you could take home, plug in and use at once, rather than having to spend time and more money getting the vital ingredients together from different shops or manufacturers.

The next Amstrad, the CPC664, was launched in April, 1985, and for a time it looked as if Sugar and Rice might have the recipe wrong. The company intended to sell 600,000 of the model which featured a built-in disc drive but its lack of memory was a disadvantage and it was dropped quickly in favour of the CPC 6128, which not only had a built-in disc drive but the 128K of memory to make it worthwhile. Murmurs were heard from smaller dealers who had been left holding 664s which they could not sell except at a loss, but the Amstrad wagon was rolling and continues to appear unstoppable.

With the autumn, 1985 debut of the PCW8256, the first complete word processor package to be affordable by the home enthusiast, Amstrad profits have convinced even that most Victorian of institutions, the Stock Exchange, that Sugar knows not only what he is doing but also what the public wants. Sales of the computers helped convert an expected £15 million half-yearly profit into a £27.5 million bonus as at December 31, 1985, and share prices rose.

France and Spain have already tasted the sweets on offer from Amstrad. Sugar is targeting the U.S. and Canada for his confections in 1986 and nobody is predicting disaster yet. He has not shown any interest in the 16-bit market and he is not likely to do so until other companies have made the running – and the mistakes. Sugar is not an innovator; he is a salesman and the British microcomputer industry and the British micro-using public should be grateful that he is.



Alan Sugar, chairman of Amstrad.

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Amstrad computers have a text screen which is 80 columns by 25 lines, an error-free tape reading system and a reasonably fast and capacious disc system. Serious software writers, hobbyist and professional, appreciate such features. Add to that the plug-in sideways ROM idea, pioneered by the BBC computer architects, which adds instantly-accessible software to the computer's friendly operating system and you have a computer on which it would be a criminal waste to play only games.

In addition, the disc-based Amstrads have CP/M, the business operating system, and although CP/M software will be considered in this round-up, it is interesting to note that the quality and complexity of much of the Amstrad sideways-ROM software is as good – and some would argue, better – than the traditional CP/M packages costing many hundreds of pounds. Alan Sugar alone has succeeded in bringing down the cost of serious software.

Plenty of choice

Alternative languages abound. Abersoft does Forth, while Hisoft does Pascal and C. Logo is available free with the CP/M disc system. Go-faster programmers who do not want to spend time learning Forth or Pascal can get their hands on a Basic Compiler – Abersoft and Hisoft – or drop into machine code, where a number of editor/assemblers will help sort the bits from the bytes.

Do not assume that everything is listed in the Amsoft catalogue or that companies not featured in the catalogue are not worthy of consideration. Word processors are a good case in point. The catalogue has Easi-Amsword – Juniper Computing – an inexpensive word processor, sharing pages not only with Advanced Amsword – Tasman – which transferred virtually unchanged from the Spectrum Tasword, but also with Microscript (Intelligence Ltd) which is a CP/M multi-function



We look at the range of software available for the Amstrad CPC computers.

word processor. Most commendable, it would seem, except that Protext from Arnor, which is arguably the best Amstrad WP at any price, is strangely missing. Perhaps the balance should be redressed by highlighting the serious software not mentioned by Amsoft.

If you want your printer to do more than print program listings, DUMP and FONT utilities are needed. There is a selection of such routines from various manufacturers, on tape, disc and ROM. Hisoft FONT64 tape produces a large – 225mm. x 170mm. – grey-scale screen dump and has a font designer which works well enough, although there seem to be a few bugs in the printer option software on which Hisoft has failed to comment.

Micropower has a toolbox ROM which produces, among other goodies, dumps in 200 x 140mm. and 130 x 70mm. sizes. Tasman Software markets Screen Copier which produces grey-scale dumps and has a special facility to create, with help from scissors and glue, a giant poster-size dump. Another separate piece of software, also on tape or disc, prints special ready-made fonts, including a near-letter-quality style, and that will work with Basic print output or with the Tasman word processor.

On-screen painting and designer software is also available in some quantity but only a few types run without hardware devices such as light pens and mice. The best of them is Screen designer by Amsoft; it is considered to be excellent for serious work, because small portions of the picture can be magnified to allow finely-detailed pixel painting.

Music packages are rather less plentiful. Kuma dared to market one which would not play chords but that was a long time ago. The most recent offering is The Music System from Rainbird, which makes the Amstrad look like a synthesiser – every bit as good as the BBC and nearly as good as the Commodore 64.

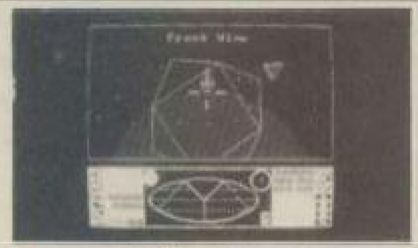
The Music System – or YMS for short – has had the advantage of being available on the BBC for some time and it is not surprising to see the most popular programs transferred to the Amstrad, even though it often takes time to re-write the software in Z-80 code. The BBC micro brought sideways ROM to the U.K. with word processor disc doctors, assemblers and utilities all available at switch-on and not using precious memory space.

Preferred assembler

Arnor produced the first sideways ROM for the Amstrad, a Z-80 assembler called Maxam which has an editor which is almost a small word processor. Maxam has now become the preferred assembler for Amstrad machine code programmers and it looks as if its second offering, the Protext word processor, is set fair to become a best-seller, too.

Arnor seems to have an unofficial competition with Micropower to see which can produce most ROMs. At present its products offer little overlap, with Micropower producing a Basic extension ROM – excellent, but for the 464 only – a mailing list and a database, and Arnor with Maxam, Protext, a spelling checker and a mail-merge – the last two for Protext. Both companies produce a disc utilities ROM and Micropower is soon to release an assembler and a word processor, so there may be some fierce competition.

Amstrad computers no longer lack serious software. Databases, spreadsheets, home finance packages, small business accounts packages, typing tutors, and word processors of good quality can be bought for less than £40.



The Arnold was launched at the time when everyone was saying any new computer which readed the market was bound to fail. The logic was that, apart from a few buffs, any new machine would fail in the mass market because of the lack of software and the software houses would not write software for a new machine when they could write for the huge number of Spectrum and Commodore owners on machines with which their authors were familiar.

So how did Amstrad break the vicious circle? First, Amsoft was set up as a channel between author and distributor and, second, it was very simple to convert software from the Spectrum to the Amstrad.

The second fact, the ease of conversion, while vital in the early days, is proving to be a two-edged sword. You are a software house. After investing thousands of pounds in a new game for the Spectrum, months of delay, frustration and finally it is ready for release. So why not release an Amstrad conversion at the same time? Hook the two computers via an RS232 interface, change a few of the screen routines, and you have done it.

Frankly, if that was all that happened, you might as well have bought a Spectrum. You have just spent an extra £250 for a steady picture and a few quick sound effects. Worse than that, because of the way the video RAM overlays the memory, the screen handling is slower.

So for the Amstrad owner, the games to choose are those written specifically for your machine. The first was *Sorcery*, and later *Sorcery Plus*. Although released first on the Commodore, Sorcery was virtually re-written for the Amstrad. Simple in concept, almost primitive by today's standards, you have a two-dimensional, non-scrolling maze. You can carry one object, which will either destroy a baddie or open a locked door. Your quest was to get through the maze, unlocking the doors which released your fellow Wizards from the clutches of the evil Necromancer.

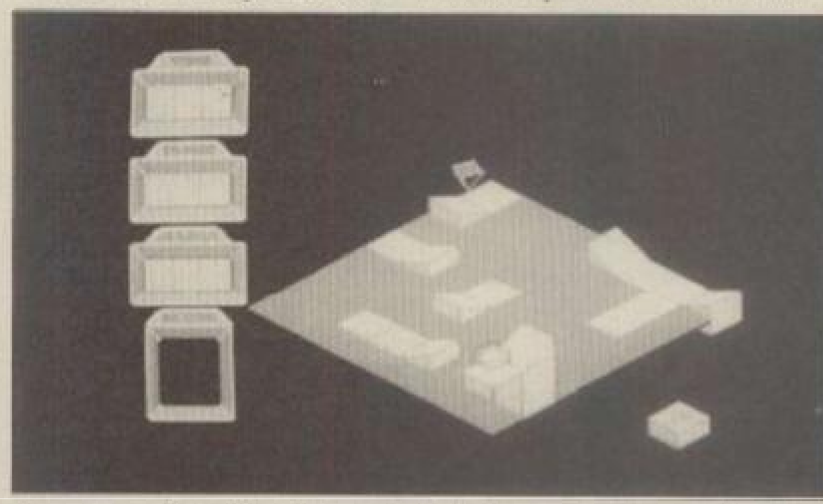
Expanded version

Sorcery Plus was an expanded version of the game on disc only, which loaded each new screen as it was needed. It also added a new level where, having freed all the Wizards, you then had to confront the evil old bloke himself in a final showdown. What undobutedly lifted the game to classic status was the graphics. They made full use of the large Amstrad screen, showing what could be achieved if programmers really put their mind to it.

Another reason for the game's longevity was that since its release, no other game has gone close to it. In the last year or so one conversion after another has done little to enhance the machine's reputation. Worth a mention in this category are *Jet Set Willy* (The Final Frontier) from Software Projects, *Alien 8* from Ultimate, *Exploding Fist* from Melbourne House, *Marsport* and *Sweevo's World* from Gargoyle, and *Lords of Midnight* from Beyond.

Fortunately things have begun to look up again. *3D Grand Prix* was a good effort from Amsoft and the first real quality motor racing game on the Amstrad. You get a perspective view from the car cockpit, gears, wing mirrors, many different circuits, all the knobs. You have only digital steering – straight, full left or full right lock – and digital skidding – you were either on the track or in the catch fencing – but it remains the best of its type.

The present passion for *Mad Marbles* clones has spread to the Amstrad. *Spin Dizzy*, from Activision, reviewed elsewhere, was written specifically for the Amstrad, and graphically takes up where Sorcery left off. The last recommendation is also from the pile of recent releases. Amstrad *Elite*, while superficially just a conversion of the Spectrum version, has had an extensive re-write for the Amstrad, including colour. It will impress those previously unimpressed with your "toy computer". Your spaceship hurtling towards a red sun, lasers blasting into the hull of an enemy ship executing an Immelman in front of you, should silence most critics.





Try to buy Amstrad hardware accessories over the counter and you are likely to be disappointed. That is not to say that the machines are without support, as Mary Sargent reports.

If you habitually frequent high-street computer stores or have merely dashed in and out of one of them to buy your Amstrad computer, you may have noticed the lack of shelf space given to Amstrad accessories. You might even find it difficult to buy a common-or garden joystick for the machine over the counter. Do not make the mistake of thinking that the Amstrad is a machine without support. Nothing could be further from the truth and there are now enough Amstrad hardware goodies to fill the computing section of those stores many times over.

Time was when some of the hardware, together with a great many software titles, could be ordered from Amsoft, the marketing branch of Amstrad Computers. Amsoft has now been sold to "a new company created for the purpose" and whether the new company will continue to produce Amsoft's regular and informative peripheral and software catalogue is not yet apparent.

Growing choice

Most Amstrad add-ons will function on any of the Amstrad machines and the choice is growing every week, as competing firms scramble for a slice of a market now in excess of one million users. The principal "official" add-ons have little or no competition. The products produced by Amstrad are both reliable and priced realistically. Green-screen monitor users are likely to want the CPC6128 modulator at £29.95 or the CPC464 modulator at £14.95, since this piece of hardware allows the computer to display its picture on an ordinary domestic TV set.

The Amstrad monitors, green or colour, cannot be bought separately, so you must decide at the time of buying the computer whether to save £100 and "go green" and thereafter buy a modulator and borrow the family TV set to enjoy all the Amstrad games, or whether to buy the colour version and then go blind trying to read 80-column text and figures on the CP/M business software.

Decisions, decisions. Never mind, the Amstrad joystick costs £14.95, has two fire buttons and can be bought without soul-searching. So, too, can the disc drive-CP/M package for the CPC464. It costs £159.95 and Amstrad has a monopoly here, so you do not need to look elsewhere. A second disc drive – for any Amstrad – costs £99.95. Compare those prices with BBC disc systems and then you will think you are just parting with pocket money.

The remaining Amstrad-produced peripherals are the speech synthesiser, light pen, RS232 serial interface, and DMP 2000 dot matrix printer. All those items have their independently-produced equivalents. The main observation which can be made is that the Amstrad versions offer a range of facilities which can be bettered, but usually only with a corresponding higher price.

Assuming that you already have a disc drive, the most expensive peripheral likely to be purchased for the computer is a printer. Amstrad has had two attempts at marketing its own printer. The first, the DMP1, was not well-received, but the latest, the DMP2000, is a 9-pin dot matrix printer with Epson-compatible control codes and gives a clear printout in a wide choice of type sizes. Most software producers seem to assume that users will have an Epson FX/MX/RX series printer and supply primary routines for that eventuality. Routines for the DMP1 usually are provided as the second option. Epsons – and presumably Epson compatibles – work satisfactorily on Amstrad computers, despite the fact that the computer has a 7-bit Centronics port rather than an 8-bit one. Some printers may not perform all their functions when the eighth bit is missing. For those who require colour printing, the Okimate 20 at £299 is a good buy and it can print a crisp black near-letter-quality typeface.

DART ELECTRONICS
Unit B5, Oulton Works,
School Road,
Lowestoft,
NR33 9NA
Tel: 0502 513707

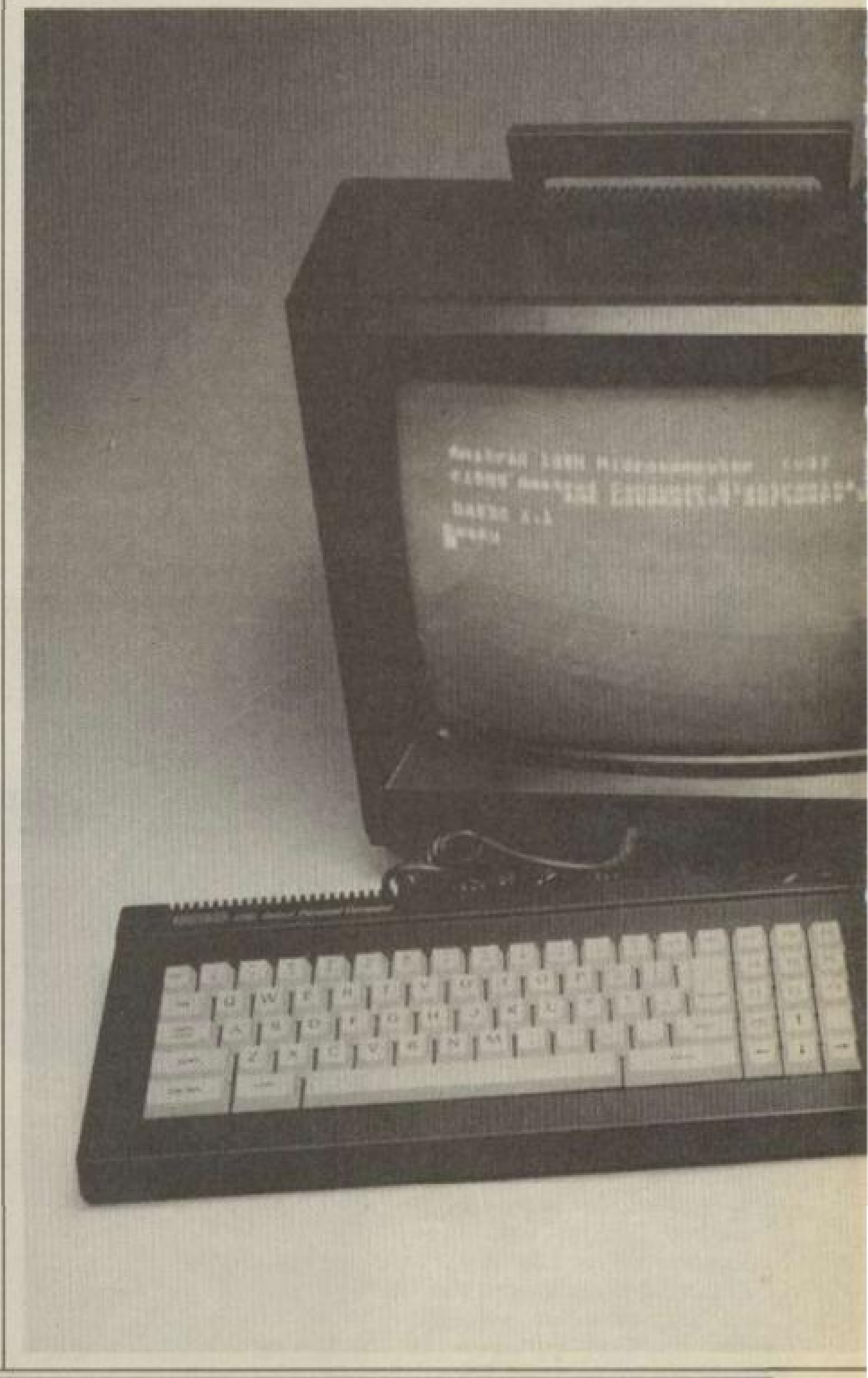
DATAPEN
Kingsclere Road,
Overton,
Hampshire, RG25 3JB
Tel: 0256 770488

DK'TRONICS
Englands Lane,
Gorleston-on-Sea,
Great Yarmouth,
Norfolk,
NR31 6BE
Tel: 0493 602926

ELECTRIC STUDIO
PO Box 96,
Luton, LU3 2JP
Tel: 0582 595222

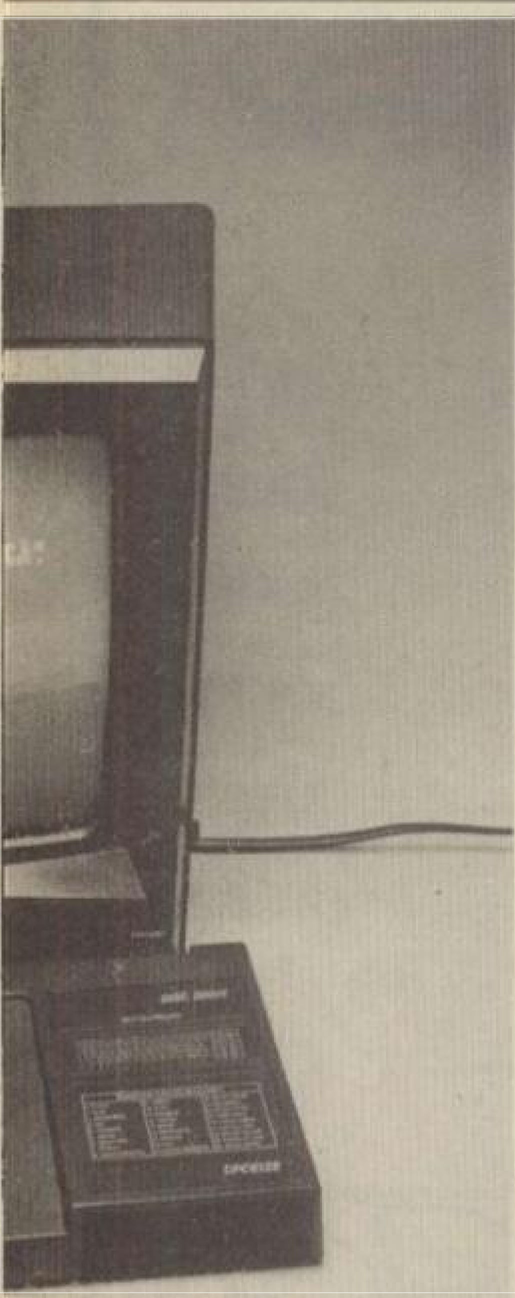
AMS
Green Lan
Appleton,
Warringto
Tel: 0925

CENTRAL EXCHAN
Ashton Lo
Ashton Rc
Dunstable
LU6 1NA
Tel: 0582



Light pen packages abound for these computers. There are four, ranging from the simple Amstrad at £19.95 to the sophisticated Dart Electronics offering at £39.95. In between

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52682
. TRADE
GE
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ad,
, Beds.
54334



are the dK'Tronics at £24.95 and the Electric Studio, from £19.95 to £44.95. I am not sure the Amstrad market can support four light pens and there seems to be a battle between the three independents, with software enhancements and price adjustments making it impossible to identify a best buy.

All a potential buyer can do is try them in a shop or read recent reviews of each pen. Remember, though, no light pen can draw anything on a dark background. For that, you must change to cursor-control drawing, or buy a mouse, trackball or graph tablet peripheral.

Monopoly

The AMX Mouse package has, by default, enjoyed a monopoly on the Amstrad, because the Central Trade Exchange Icon art-star program using the Marconi trackerball has, at the time of writing, not appeared in Amstrad format. Both AMS and CTE have moved their equipment and software from the BBC micro and it will be interesting to see how the two icon packages fare on the Amstrad, with its lower screen resolution but higher memory capacity.

Art package

The AMX Mouse has an art package and a control package, the latter allowing the WIMP – windows, icons, mouse and pull-down-menus – system to be used in your programs from Basic. AMS produces a range of icon-driven software for the BBC computer and its most recent release, the Page-Maker, is awaited eagerly for the Amstrad. Grafsales produces Grafpad 2, a Ferranti graphics tablet with accompanying software. Its main use is for the more serious technical drawing type of application but it is ideally-suited to accurate freehand drawing, since the tablet is used like a piece of A4 paper. Further, it is the only type of drawing package where tracings can be made.

RS232 is the serial interface you will need if you want to dabble with modem-telephone communication or talk to a typewriter/printer such as the Brother EP44 or a printer/plotter such as the Tandy CGP115. The Amstrad interface provides the full specification of RS232 and also has the ROM software to communicate with Prestel in eight colours. At £49.95, it is relatively inexpensive. More expensive at £99.95 is the Skywave Multiport, with full RS232, a 24-bit parallel port and Prestel software.

Prestel route

Getting into Prestel involves buying an RS232-driven modem, of which there are many on the market from prices starting at around £30. Amstrad and Skywave probably did not want the hassle of obtaining British Telecom approval for any modem they may have been thinking of producing and instead added some Prestel software to a standard RS232 peripheral; £50 and £100 is a good deal to pay for the privilege of driving RS232 printers and if it is only modems in which you are interested, there are four which plug directly into the Amstrad.

The cheapest modem is undoubtedly the Cirkit acoustic modem – £30 – which has controlling software for RS232, +5V implementation, and Prestel on tape. As far as the direct-connection modems are concerned, the choice seems to be between the KDS104 – KDS Electronics, £153 – the Magic Modem – DataStar Systems, £115 – and the Pace Nightingale/Commstar package. Magic modem and KDS have Prestel software and a multitude of other goodies such as autodialling but BT approval is pending, so the equipment is not legal at present. The Nightingale is a much-respected modem, BT approved, and Commstar uses the splendid Honeysoft communications software.

It is interesting to note that the more recent hardware peripherals are being equipped with ROM rather than tape software. The dK'Tronics speech unit now has its considerable software in ROM, whereas the Amstrad version has only tape software. Both speech units are otherwise similar, offering similar speech commands and on-board amplification for the speech and stereo reproduction of the computer's sound output.

There are peripherals which simply hold chips. dK'Tronics seems to have the RAM field all to itself with its add-on memory. The 64K board upgrades a CPC464 with disc to a CPC6128, with the exception of some of the extra Basic commands which 6128-Basic provides. A 464 with dK'Tronics RAM can do more than a 6128. File-storing in the extra bank of memory is more flexible and some clever software in ROM gives the 464 screen windows which do not destroy what is already on the screen. That makes designing pull-down menus possible from within Basic.

Not expensive

At £49.95 for an additional 64K and £99.95 for an additional 256K, large-capacity memories are no longer expensive. There is even a 256K Silicon Disc RAM for 464 and 6128 users, also at £99.95. Another firm, Micropower, has a virtual monopoly on boards which hold ROMs. Its sideways ROM board can hold up to seven 8K or 16K ROMs, which can be its own ROMs – it markets six ROM-software utilities – or other companies' ROMs. When one board is full, another can be added. Each board costs £39.95. A smaller four-ROM board is available from KDS at £29.90.

Robot centre

Finally, the control of robots and other appliances may be eased by the parallel port board, also from KDS. It needs to be fully-buffered to communicate safely with high current and high voltages. At £25.30 it should be but if you are thinking of buying, check first with KDS.

Where's all that memory? Get your full 128's worth

Dick Sargent gives you the info even your own manual won't tell you.

Eight-bit microprocessors like the Z-80 used in all Sinclair computers except the QL, and address only 64K of memory from location zero through to 65535 (FFFF hex). The arrangement of the computer operating system, language, screen memory and program memory in that 64K space is shown in a memory map. The 16K and 48K Spectrums can be programmed satisfactorily in Basic without consulting a map but 128K programmers are likely to find it an extremely useful aid.

Any extra memory placed on the Z-80 CPU address and data bus will remain invisible to the system unless some of the memory between 0000 – FFFF is switched-out to allow some of the extra memory to take its place. The amount moved is usually a generous portion, with 16K being the preferred size. Any RAM – or ROM for that matter – in excess of 64K is arranged neatly in 16K banks, ready to be switched into the CPU field of operations.

The Spectrum 128 has bank-switching arranged as shown in figure one. In its Spectrum 48 mode the CPU sees only the Basic ROM and 48K of RAM, now called page 5, page 2 and page 0. That represents the 64K memory map of all the older Spectrums, with the exception of the unexpanded 16K Spectrum, which lacked the 32K RAM represented by page 2 and page 0.

ROM swap

The extra facilities of the 128 are contained in a 16K Editor ROM which is interchanged automatically with the Basic ROM, in much the same way that the Interface One ROM is made to occupy the bottom 16K of the map whenever the Microdrives are used. When you EDIT on the 128 – whenever you enter a new program line or change an existing program line – some of the RAM is shuffled around, too.

The Editor needs an image of the screen-listing and some workspace of its own. Page 0 is moved aside, with its contents intact, and a new bank of memory called page 7 takes over in the top 16K of the map. When Editing is finished, page 0 becomes active again. The user normally will be completely unaware that the changes are taking place.

Page 7 is not the only bank of RAM which can occupy the top of the map. Other candidates for the position are pages 1, 3, 4 and 6, each 16K in size. That RAM is completely unused by the operating system and by Basic programs, which are still limited to the 5B00-FFFF area and cannot grow larger than about 40K.

The extra RAM, however, can be used for DATA. The new operating system of the 128 sees this 64K of RAM as a very fast cassette, though Sinclair uses the industry-standard term RAM-discs, and so all the file commands normally available to cassette can



The Spectrum 128. What's under the lid?

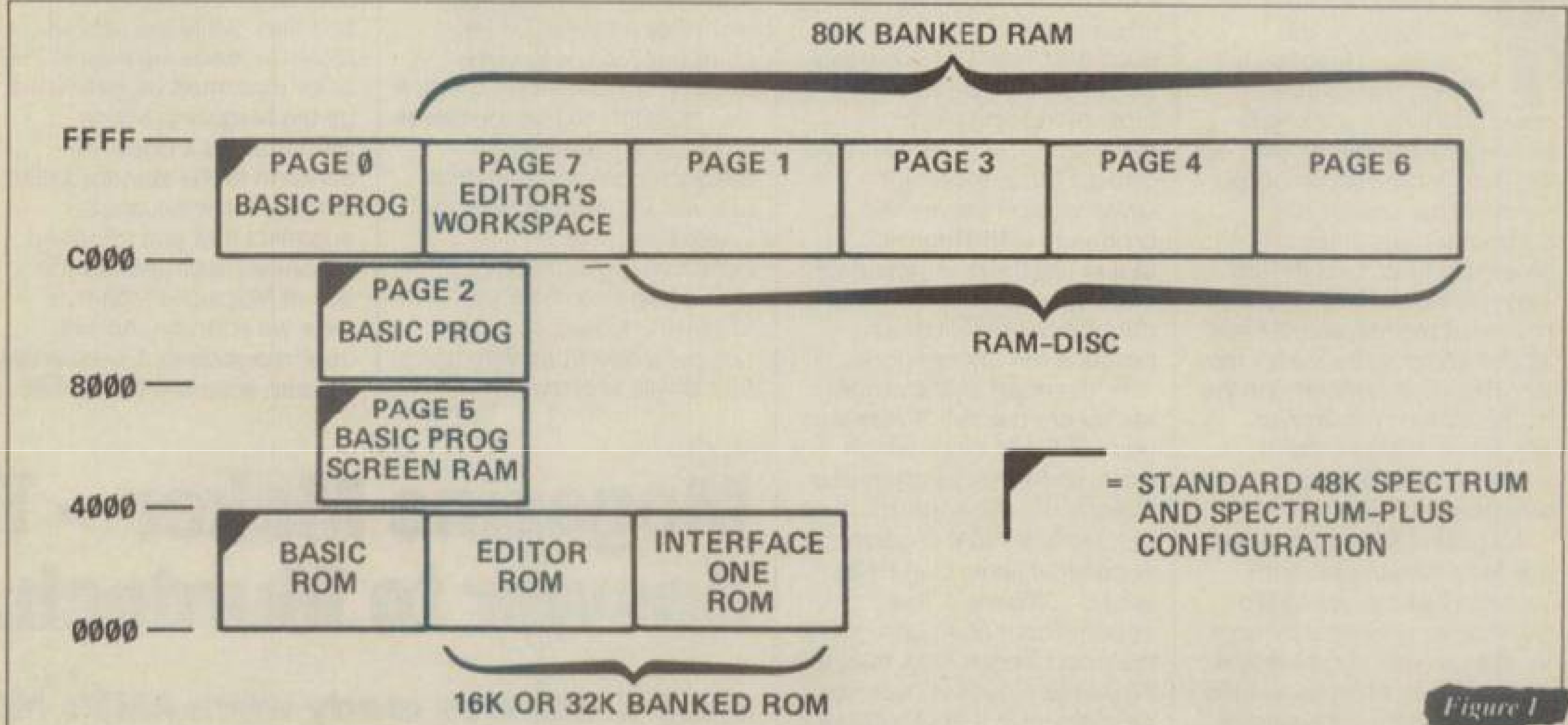


Figure 1

be applied to the RAM-disc, with the exception of VERIFY, which is not needed. In other words, Sinclair has designated the RAM into as a device, rather like a Microdrive or a modem, and you can communicate with it via a channel. It is a serial device, comparable to a very fast Microdrive, but is not a true RAM-disc because files are loaded and saved sequentially – there is no random access.

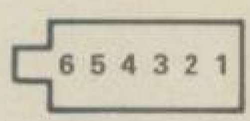
Further, the procedure of opening a channel and passing the information through that channel adds a time overhead to the data transfer which can be removed only by bypassing the operating system and implementing the transfer by using machine code programming. Sinclair has used the channel approach because it is simple to understand and gives great flexibility and compatability in the design of 128 programs.

Recalling a SAVED screen from RAM-disc is a fast but not an instantaneous operation. In applications where a second screen needs to be generated quickly, page 7 can to be used to store and thus recall an alternative screen. That option is available only to machine code programmers and involves setting a bit in a register which then configures part of page 7 as the new hardware screen. It is an instantaneous operation.

The advantage of using page 7 to store a screen is that it is unaffected by RAM-disc operations. The one disadvantage, however, is that it will be destroyed by the action of the Editor which needs the RAM for its own use. It is apparently also possible to use the fast Z-80 block-move instruction LDIR to move screen data directly to and from pages 1, 3, 5 and 6. Using that method, the screen data does not pass through channels and the operation is as near instant as possible, bearing in mind that some 6.75K bytes are being moved from one location to another. Eight screens can be stored in those pages and they are protected from the action of the Editor but not, of course, from the RAM-disc.

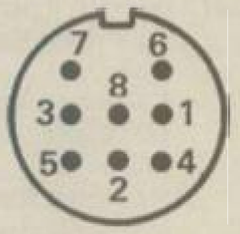
The Spectrum now has an RS232 port, an RGB port and a keypad port. Note, however, that Microdrives still cannot be fitted without the Interface One accessory, which also has its own RS232 port. Whether the 128 will be treated to a new version of Interface One remains to be seen. The ports are a spin-off from the Spectrum sound chip.

Sound is produced by the ubiquitous AY-3-8912 programmable sound generator, a chip which has a spare 8-bit I/O port on board. Four lines of that port communicate with the remote keypad and the other four lines form the RS232 interface. Software routines are used to perform the parallel-to-serial conversions and the timing signals for the RS232 and the port can also be configured to the Midi standard for driving synthesisers and other Midi musical equipment. The RS232 and RGB port pin-outs are shown in figures two and three.



PIN	NAME	FUNCTION
1	GND	0 VOLT REFERENCE
2	TXD	INPUT, DATA TO COMPUTER
3	RXD	OUTPUT, DATA FROM COMPUTER
4	DTR	INPUT, FLOW CONTROL TO COMPUTER
5	CTS	OUTPUT, FLOW CONTROL FROM COMPUTER
6	+12V	POWER

Figure 2



PIN	SIGNAL	LEVEL
1	COMPOSITE PAL	75 OHMS, 1.2V p-p
2	0 VOLTS DC	
3	BRIGHT	TTL
4	COMPOSITE SYNC	TTL
5	VERTICAL SYNC	TTL
6	GREEN	TTL
7	RED	TTL
8	BLUE	TTL

Figure 3

Magazine Maker – The Answer to Murdoch. Wa

Gary Evans was ready when AMS's Magazin

While new computer technology in the publishing industry is hitting the national news headlines, packages offering similar page make-up systems for microcomputer have hit the news in the computer magazines in recent months. Last month *Your Computer* featured a review of the Mirrorsoft *Fleet Street Editor* software for the BBC micro; this month it is the AMX/Watford Electronics *Magazine Maker* suite of software to which we turn our attention.

Magazine Maker combines the AMX Pagemaker with Watford Electronics *Video Digitiser* to provide a de luxe system able to combine text and digitised pictures to form final pages of an impressive quality. It is inevitable that those considering entering publishing on a small scale will be eager to learn which of the two products offers the best value. Such a judgment, though, will be difficult to make as there is a considerable difference in the price charged for the AMX and Mirrorsoft offerings.

While Fleet Street Editor sells at slightly less than £50, a complete AMX/Watford system will be more than twice that price. Spending the extra money, however, will mean that the 'micro publisher' has at his disposal an extremely powerful typesetting and page make-up facility. As with Fleet Street Editor, the major limitations on the results produced with Magazine Maker are those imposed by the limited resolution of the dot matrix printer used to produce the printed page.

At the heart of Magazine Maker are the two ROMs and pairs of 5¼in. discs which make up the AMX Pagemaker. In addition, the Watford Electronics Video Digitiser is supplied with its own ROM-based software. A final, optional item of equipment is the now famous AMX mouse. While the mouse is described as optional in that Magazine Maker is compatible with both keyboard and joystick operation, those who wish to get the most from the system should consider the mouse an essential requirement.

Twin drives useful

The equipment used for this review comprised a BBC B micro with Watford DFS, double-sided 40/80-track disc drive, Taxan Kaga 810 printer together with an Panasonic NV-870 VHS video recorder and Akai VC-X2E colour video camera. For technical reasons, i.e., a complete lack of double-density, double-sided discs, it was possible to use the drives only in a single-sided, 40-track configuration; that was not ideal and meant that in use there was a considerable amount of disc-swapping required. Magazine Maker, though, supports operation with up to four drives and may be configured for 40- or 80-track discs. The use of twin drives would add greatly to the ease of use of the system, while to keep disc swaps to an absolute minimum, three drives would be required.

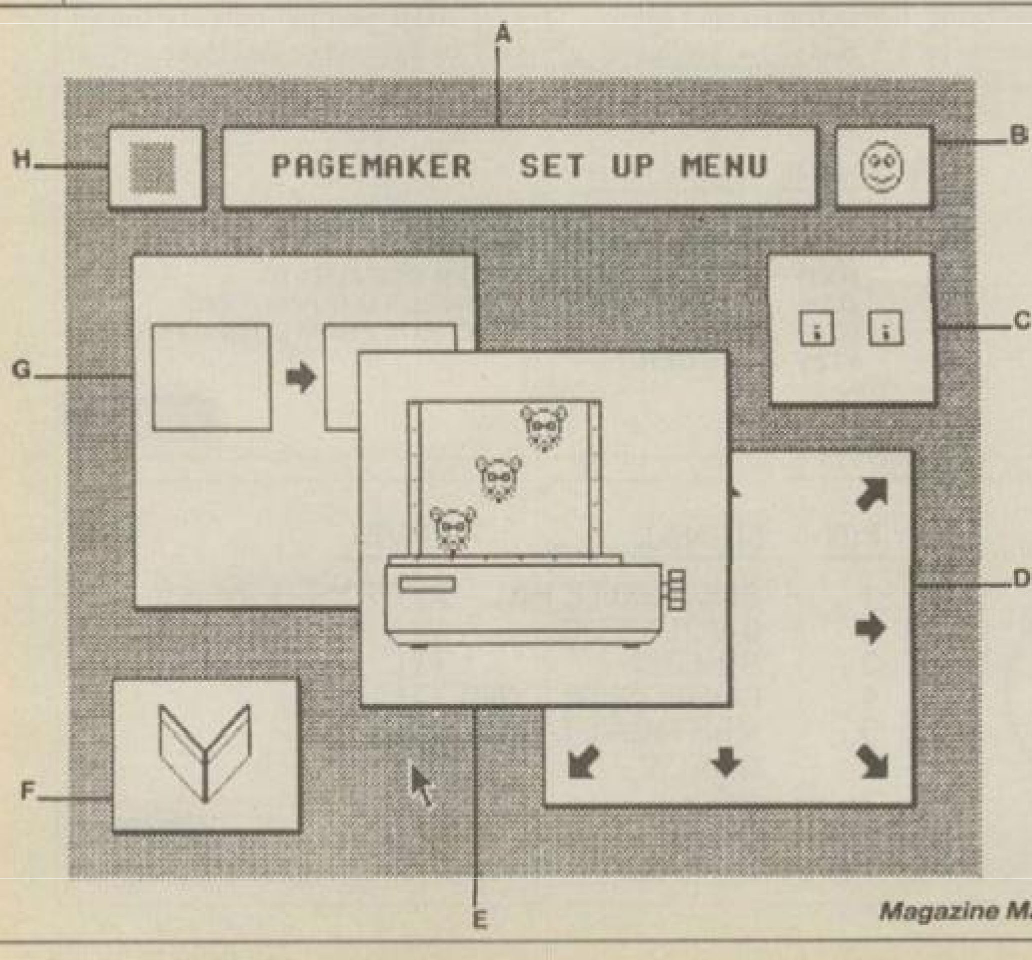
Before starting work with Magazine Maker, make sure you have plenty of blank discs to hand; the manual suggests that you begin with at least five. Four of those discs will be used to store elements of the final page, both graphics and text files, while the fifth will store the made-up pages. The latter disc must be formatted by the Magazine Maker formatter, as it does not conform to the standard disc format. The manual also suggests that you adopt an organised approach to the use of Magazine Maker, a view we endorse. As with 'real' magazines, it is essential to keep accurate track of all the elements which will combine to make the final pages as they are created.

Magazine Maker is called into action by the usual SHIFT-BREAK key sequence; the first main menu screen will be displayed after a few seconds. From now we shall assume that the system is being used in conjunction with the AMX mouse, in which case the first operation is to move the on-screen pointer to the 'Setup' icon and to click the left-most button on the mouse.

The three buttons of the mouse are designated, from left to right, Execute, Move and Cancel. Many critical system operations, such as the selection of the set-up option, require that both the Execute and Move buttons are clicked in turn, to avoid any difficulties caused by switch bounce which would lead to a double click which would confuse both machine and, more important, the user.

Parameters set up

The set-up menu allows a number of important system parameters to be defined. They include selecting the appropriate printer driver from those supplied on the system disc and positioning the screen display to suit the monitor used with Magazine



A – Foreground Colour Change Icon
B – Sound On/Off Icon
C – Disk Initialiser Icon
D – Screen Position Icon
E – Printer Setup Icon
F – Return To Main Menu Icon
G – Mode Convertor Icon
H – Background Colour Change Icon

Magazine Maker's set-up menu

Maker. Other set-up options include the page disc formatter referred to and a mode converter for transforming graphics files created in modes 1 to 4 into the mode 0 files used by the system. When the system parameters have all been specified, clicking-on the main menu icon will return the user to the front end of the system.

The next section of the mode will be used only to enter small amounts of text, such as headlines, for the software allows text files to be prepared off-line under either Wordwise or View to be configured on the page. One of the very powerful facilities of Magazine Maker is the ability to define on-screen windows. Thus, unlike Fleet Street Editor, the user is not restricted to a rigin one- or two- column page but can

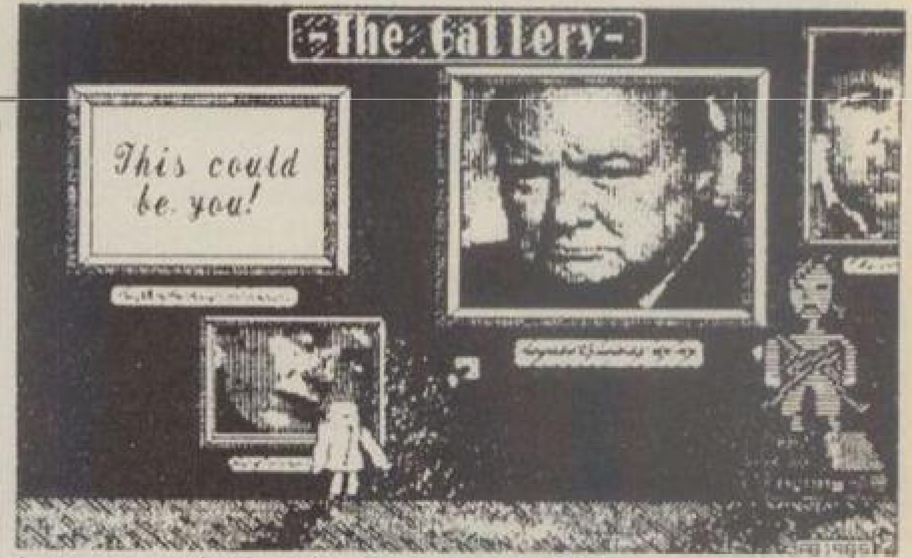


Image processing in action. From video or stills.

Poor Man's
atch out Wapping

e Maker reached our offices.

manual describes the definer section of the program but, as it points-out, corretly, most users will not need that facility until they have used the page make-up option. We shall therefore jump to section six of the manual and look at the creation of pages.

The page make-up section is entered from the main menu. Once the software has loaded, the screen will clear to show a blank work area, together with a series of icons down the right-hand edge of the screen. A message at the top of the screen will prompt the user to insert a correctly-formatted page disc into one of the system drives and then to press the mouse Execute button. That will cause a catalogue of all pages on the disc to be displayed in the centre of the screen.

At present all pages will, naturally enough, be blank. To start work on a page it is necessary only to click the mouse on the appropriate file name, when it will be loaded into memory. Discussion of the manipulation of picture elements will be left until we describe the Watford Electronics Digitiser; for now the way in which text is placed on the page will be described.

While Magazine Maker allows direct entry of text from the keyboard, in general that choose the layout at will.

To define a window, it is off to the right-hand side of the screen that the pointer must be dragged and clicked on the window icon. Once again, a menu of options is displayed at the top of the screen, the one required in this case being the define option. Cross-hairs displayed in the main window will then allow the top right and lower left corners of the current window to be defined in conjunction with the Execute and Move buttons.

Having set up a window, the pointer can be moved to the text icon. After clicking-on that, another menu at the top of the screen will allow the user to choose from one of the 16 fonts supplied on the font disc, Many of those fonts are most suited to headline writing but also supplied is a face designated 70SERIF which is based on the BBC mode 0 character set, the difference being that serifs have been added. That makes the text far easier to read.

Selecting the font required is not the end of the story; the user should also pay attention to the size in which the text will be displayed in and the spacing between the lines. The variations available in those areas would put some professional typesetting equipment to shame. The text may be enlarged in both the vertical and horizontal directions, allowing some very interesting effects with some of the fonts. Spacing may be altered both between lines and between characters. During configuration of those options, depending on the number of disc drives in use, the user will have to swap between system, font and text discs.

Having specified the typeface and size, the text file may be called from the selection of options displayed at the top edge of the screen. An on-screen cursor must then be placed at the point in the current window at which the text is to start. Clicking the Execute button will then cause the text file to be read in from the text file disc.

Powerful system

The screen shows the text coming in line by line with each line being displayed twice. That is because, as the text file is read, Magazine Maker will justify the text on a line-by-line basis, to give the right-hand edge of the text an even appearance. That is the way much printed material is reproduced although, if required, justification can be switched-off by way of the text system menus. The screen can show only part of the finished page and when the text has reached the end of the screen, or the current window, the system will prompt the user to choose from a set of actions. They include the straightforward option of continuing in the current column, moving up the page, or of defining a new window.

From the foregoing, it is apparent that Magazine Maker provides a versatile and easy-to-use method of text positioning and display; the power of the system is enhanced, however, by an equally powerful system which allows digitised pictured and graphics to be incorporated within the same page.

What a picture

The Watford Electronics Digitiser allows video images to be incorporated within Magazine Maker pages. The digitiser is supplier with EPROM based software, the unit itself is plugged into the BBC micro's user port. Images may be digitised in modes 0, 1 or 2 although frames produced in modes 1 and 2 will have to be converted to mode 0 before they can be included as port of a complete page.

Once stored the imagte can be manipulated by the page Maker Software – facilities available include the ability to zoom in on selected parts of the image, to strengthen the picture or to flip it from left to right or turn it upside down. In addition a range of graphics commands allow the digitised picture to be 'touched up'.

Conclusion

The Magazine Maker package provides all of the facilities needed to produce pages of text and graphics, the major limitation being the resolution obtained from the dot matrix printer used to output the completed pages. When laser printers come down in price, Magazine Maker would enable any BBC micro owner to produce a magazine that would give 'professional' titles a run for their money.

BARGAIN SOFTWARE: FREEPOST

Dept. C+VG, Unit 1, 1 Esmond Road, London W4 1BR

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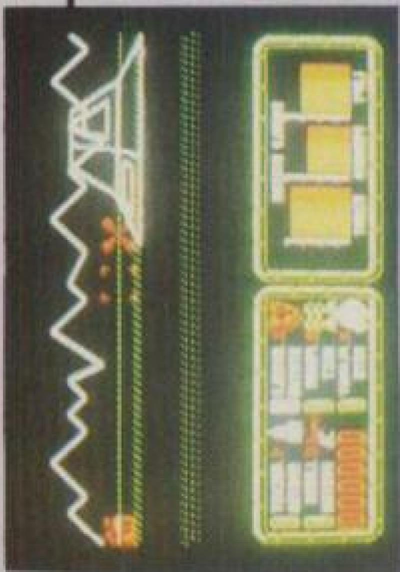
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BATTLE OF THE PLANETS

► Amstrad ● Mikro-Gen ● Shoot-em-up ● Simon Beesley ● £9.95



GRAPHICS
● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ●

At first glance you could mistake *Battle of the Planets* for *Elite, Codename Matt, Timegate,* if your memory stretches that far, or half a dozen other games. Along the bottom of the screen there is a bog-standard status panel and above the stars rushing towards you. The idea, of course, is to clear the universe of all known aliens.

Although derivative, the game is highly playable, partly because it is so easy to understand. After the complexities of a game like Elite, it is a relief to be able to home-in on an alien craft, or a planet, or a space gate, almost immediately. You line it up in your sights and it tumbles into view. The wire frame 3D graphics are some of the most impressive yet, well up to Elite and Starion standards.

Refuelling and repairing is equally simple. It is just a matter of landing on a planet and docking with another rotating polyhedron. While you are grounded, there is scope for more combat. The alien ships convert into tank-like Landers and the backdrop of stars gives way to a scrolling landscape.

Mikro-Gen calls Battle of the Planets a space adventure but it is really a space shoot-'em-up, and a very good one at that. There is no trading to be done and you do not need to worry too much about strategy. Instead you can have the unalloyed pleasure of non-stop combat.

THREE WEEKS IN PARADISE

► Amstrad 464/664/6128 ● Mikro-Gen ● Arcade Adventure ● Simon Beesley ● £9.95



GRAPHICS
● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ●

Don't be misled by the title. The weeks in question are Wally, Wilma, and Herbert Week, regular characters in the Mikro-Gen series of arcade adventure games. The game is in the same vein as *Everyone's a Wally* and *Herbert's Dummy Run*. This time round, Wally has to rescue his wife and son from the grips of a jungle tribe.

Like the previous games in the series, what makes *Three Weeks in Paradise* special is its tremendous comic strip graphics and witty animation. There is an immense variety of locations, all colourful, and usually crammed with unlikely objects and obstacles – grass huts with TV aerials, signposts, Red Indians, crocodiles, lions, giant lizards, and so on. Wally is an Andy Capp character.

Despite its light-hearted approach, solving the game's problems is by no means easy. The task involves trekking round the jungle, finding the correct objects in the proper order. You can carry only two items at a time and it is not always possible to determine a use for them. What can you do with a pair of flip-flops or a bowl of stuffing?

If you do not have a taste for text or arcade adventures you will probably find the game more frustrating than absorbing. For the rest of us, it is another satisfying episode in the continuing saga of the Week family.

THE EIDOLON

► Commodore 64/128 ● Activision ● Arcade Adventure ● D. J. Pepper ● £9.99 (Tape)

Another masterpiece resulting from the alliance of Activision with Lucasfilm Games, *The Eidolon* has a good storyline, superb graphics – using fractals once again – and although strictly speaking it is merely a souped-up 3D maze game, there is a remarkable freshness about its presentation. It is not original yet it is different.

So the story goes . . . more than 100 years ago the Professor recluse, Dr. Josef Vincent Agon, invented a powerful time/fantasy exploration machine, the Eidolon. Temptation overcomes sensibility and you find yourself sitting in the strange machine, drawn by a powerful mysticism. Suddenly you are no longer in the Professor's laboratory – you are deep inside a series of dark, shadowy caverns linked by tunnels.

In this magical underground world you encounter many fantastic beasts and strange phenomena. There are Trolls, Puffer Birds, Bottlenecks, Biter Birds, Dragons and Greps, to name a few.

Many of the beasts are under the control of strange coloured spheres, or fireballs. Red ones are dangerous but may be used to advantage against the monsters; gold ones replenish the Eidolon's energy, blue ones change the flow of time, while green ones transform one creature to another.

The game sets new standards in C64 graphics. It is almost as if the animated cavern scenery is air-brushed. The monsters are drawn beautifully, with a most vivid imagination. Instructions and hints are supplied in the form of a story-like narrative of the game, a good idea and beautifully illustrated. The only dimension to the game I dare fault is sound, of which there is little. A game which has plenty of character, superb graphics and immense playability – a hit.



GRAPHICS
● ● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ● ●

STARSHIP ANDROMEDA

► *Commodore 64/128* ● *Ariolasoft* ● *Shoot-em-up* ● *D. J. Pepper* ● *£9.95 (Tape, £12.95 (Disc)*



GRAPHICS
● ● ● ●
SOUND
● ● ● ● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ● ●

Starship Andromeda is the latest example of the current trend in multi-part games. This has five sections, referred to as Warps, which have to be loaded and completed separately. If you buy the disc version, the disc needs to be inverted to load Warps 3, 4 and 5. Flipping discs is potentially hazardous to the longevity of the disc but it seems that many software houses feel it is a small risk.

The Ariola latest is mildly reminiscent of Acornsoft/Firebird *Elite*. You are required to pilot your ship in deep space, locate space stations and gain access. You are not likely to find the task easy – the locals never seem to like strangers and the welcoming committee indulges in very hostile manoeuvres.

Tyrant Alana is ruling the Galactic Federation. The source of her power is a crystal which acts as the security key for the Mindlord computer which controls the Galaxy (natch). Your task is to scour the Galaxy for a proton lance and the two elements needed to power it – Zyron and Trysst. Then Alana must be tracked and relieved of the crystal, with the aid of the lance. It could not be simpler.

There is a definite knack to surviving ship-to-ship combat. The enemy attack pattern does not vary too much, so effectively you can stay stationary and pick them off one by one as they pass. Energy is the biggest problem in surviving; it usually runs out before time does. There is plenty to do, from landing on planets to investigating passing space traffic. It is a tough game and I should not think many will complete it; that makes it such a challenge.

The most memorable feature of Starship Andromeda is undoubtedly the sound – both music and effects. Ariola has a competent, challenging game. It does not stretch the 64 to technical limits and it is not so ambitious as Elite but worth considering to add it to one's collection.

TIME TUNNEL

► *Commodore 64/128* ● *U.S. Gold* ● *Arcade Adventure* ● *D. J. Pepper* ● *£9.95 (Tape) £14.95 (Disc)*

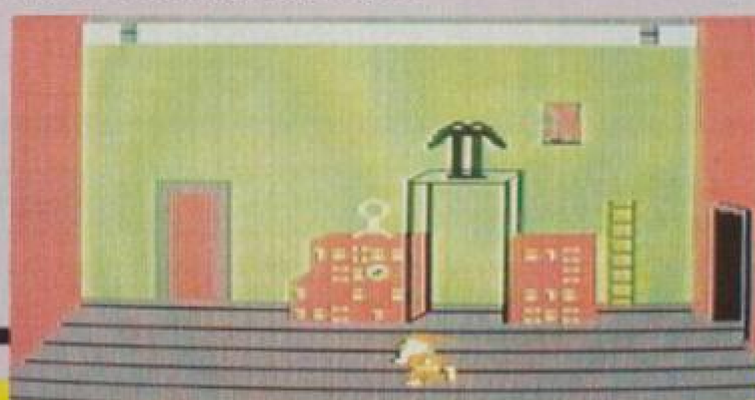
Hands up those who remember well the Time Tunnel television serial – late 1960s. The U.S. Gold *Time Tunnel* has nothing to do with that. Instead, you assume the role of strapping young lad of a gnome, aged 115, ready to become the new Gnome King. Before you can be considered suitable for Kingship you are sent on an errand through the portals of time, in search of seven parts of an ancient gnomic scripture.

All seven parts of the scripture contain the correct words for the necessary magic spell to make you King. The result is an era-hopping adventure through time, though there was no sign of any "tunnel" as such.

You begin this arcade adventure, the first true American one according to the U.S. Gold literature, in the rather modern-looking Gnome Mansion. To start one's journey, the gnomic time machine needs to be used. Unfortunately a vital part is missing. The solution happens to be the placing of a log in the fireplace, lighting it with a gnome's handy lightning bolt, thus causing the missing time machine part to appear on a table in front of you.

That is typical arcade adventure riddling at its best or, depending on your point of view, most frustrating. The clues to most of the riddles are complicated, which will delight adventurers but merely frustrate others. That is a pity, as the game exudes its own charm, with the Santa-like gnome waddling round three-dimensional scenes throughout the ages from 9600 BC – the Stone Age – up to 9999 AD. Time Tunned can be recommended to the hardened arcade adventurer but if you are not one of that rare breed, try to find someone who is and watch.

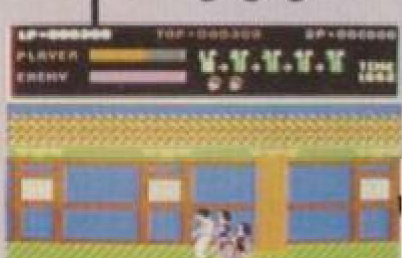
GRAPHICS
● ● ● ●
SOUND
● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ●



KUNG FU MASTER

► *Commodore 64/128* ● *U.S. Gold* ● *Arcade Adventure* ● *D. J. Pepper* ● *£9.95 (Tape) £14.95 (Disc)*

GRAPHICS
● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ●



First there was boxing, then martial arts stormed the computer game scene with chart-toppers such as *Way of the Exploding Fist*, *Yie Ar Kung Fu*, *Bruce Lee*, and the like. Rather late in the day arrives *Kung Fu Master* from U.S. Gold.

Unlike Yie Ar and Fist, Kung Fu Master is more akin to an arcade adventure than "straight" combat. Controls are familiar to players of the former two games, although there are no fancy acrobatics at your disposal.

You assume the mantle of a Kung Fu Master and you must penetrate the wizard's temple to rescue a maiden held prisoner. There are five storeys to battle your way through with such dangers as fighting guards, or henchmen, some of whom are knife throwers. Other hazards include snakes, fire-breathing dragons, exploding mystic globes, ferocious dwarfs and even killer bees. You must accomplish the tasks within a certain time and energy is also limited.

Fighting means either punching or kicking your opponent(s). The space-bar toggles between kick and punch modes. You can also jump and kick or punch in mid-air but there are no somersaults – that is left to the dwarfs.

Sound effects are reasonably good, with a realistic "punchy" sound. Music is unobtrusive but not very memorable. Graphics are average, as is the game on the whole. It is a slight case of too little, too late. If you want a "fight" game, get Yie Ar or Exploding Fist. If you want an arcade adventure, there are plenty from which to choose. As for Kung Fu Master, it does not quite fit anywhere.

CONTRAPTION

► *Amstrad 464/664/6128* ● *Audiogenic* ● *Platform game* ● *Simon Beesley* ● *£7.95*

Pretty graphics alone do not make a good game. Yet if there is one game which deserves to succeed on its graphics, it is *Contraption*. Released originally on the BBC a year ago, this platform game now makes a well-deserved comeback on the Amstrad.

As on the BBC, the program sacrifices extra colours in return for higher resolution. That allows the designers to include all kinds of imaginative details. In the first screen, for example, you have to make your way across a row of gleaming pistons as they pump up and down. The character you control, the Professor, could have been lifted from a Heath Robinson cartoon, along with the contraption he has built.

Most of the features on the BBC original have been translated successfully to the Amstrad but there is no soundtrack on this version and the animation is less smooth. The pistons, for example, now look as if they need a drop of oil.

Graphics apart, the game is also a real challenge. In traditional platform game fashion, you have to pick up objects, find the correct route, time your jumps accurately, and keep a watchful eye for passing hazards. As hazards go, Contraption's selection – floating bombs, killer snowmen, toxic plants, and the like – is fairly mild but the routes are particularly circuitous. Although there are only 10 screens, they are all tough nuts to crack.



GRAPHICS ●●●●●
SOUND ●●
PLAYABILITY ●●●●
VALUE FOR MONEY ●●●●
OVERALL ●●●●

COMIC BAKERY

► *Commodore 64/128* ● *Imagine* ● *Arcade* ● *D. J. Pepper* ● *£8.95*

Another zany game scenario. Who ever heard of raccoons causing havoc in a bakery by, among other dastardly deeds, switching off the baking ovens? It is apparent that Joe the Baker's life is tortured by chronic raccoon mischief.

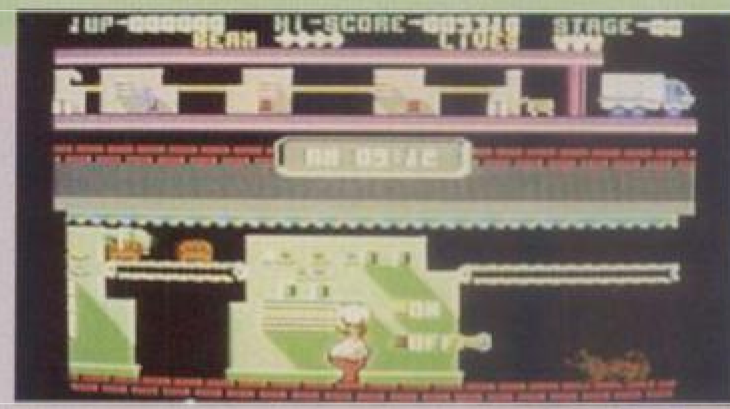
The raccoon rascals sneak into the bakery, steal loaves of freshly-baked bread, switch-off equipment and generally get in Joe's way – contact with a raccoon loses you a life. The raccoons do not have it all their way; Joe has a handy ray gun to stun his unwanted guests. While the raccoons are stunned, they obviously cannot create more havoc in the bakery and Joe then has a chance to kick them out.

Unfortunately there seems to be an infinite source of raccoons and so the measure of your skill is how many loaves you can produce and save from the thieving wildlife. At the end of a day's baking, your produce is wheeled to the baker's shop to be sold and thus you earn bonus points.

First the good news. There is some good sprite animation, plenty of pleasant colours, jolly tunes and assorted noises of which you will not tire too quickly and no-one should find *Comic Bakery* too difficult to play.

The bad news is that this latest Imagine/Konami game, despite showing plenty of potential, fails miserably in one department – it is too easy.

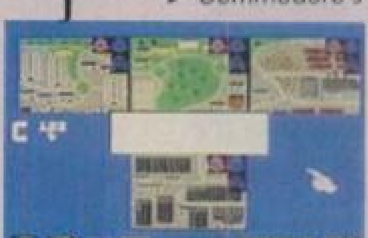
Your reviewer spent nearly half an hour playing the same game and eventually accumulated nearly 10 bonus lives before boredom finally triumphed.



GRAPHICS ●●●●
SOUND ●●●●
PLAYABILITY ●●●
VALUE FOR MONEY ●●●
OVERALL ●●●

THE FORCE

► *Commodore 64/128* ● *Mind Games* ● *Strategy* ● *D. J. Pepper* ● *£9.95 (Tape)*



GRAPHICS ●●●
SOUND ●●
PLAYABILITY ●●●
VALUE FOR MONEY ●●●
OVERALL ●●●

Have you ever wanted to be in charge of the local police force? If you have, Argus Software may have achieved the perfect alternative under its Mind Games label. On the other hand, *The Force* is a very complex and involved strategy simulation which probably will not appeal to many arcade gamers.

You assume the role of superintendent in control of Middletown, Middleshire. You have four police stations and personnel to police the area, which covers several categories of district. They include under-developed, industrial, commercial, retail and night spot areas. Also on your patch are the local airport, football ground, shopping precinct and railway station.

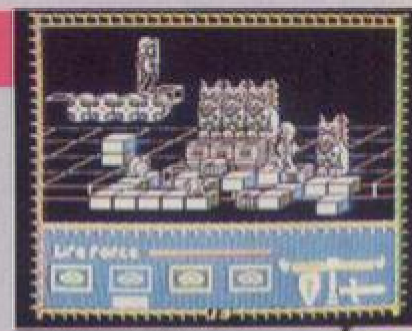
Different areas need different levels and approaches to policing. You control foot and motorised patrols, mounted police, dog handlers, a community liaison officer, crime prevention officer and reserve forces. According to how efficiently those police units are deployed, your aim is to maintain a low crime rate and high community goodwill.

The program is icon-driven, with a rather large pointing hand used to make selections. I have seen better icon/pointer systems; for example, the pointer hand is so big and points only from one angle so that sometimes it obscures vital prompts. A full screen schematic layout of Middletown shows you where everything is and by using the pointer you can view a sector close-in. In play, there seems to be an alarming frequency of bank and Post Office raids.

The Force requires plenty of stamina to even get going. The instructions are not of much help and there is not a lot of excitement. Another specialist, cult maybe, program, to be investigated before buying.

RASPUTIN

► CBM64 & Spectrum ● Firebird ● Arcade Adventure ● Lee Paddon ● £8.95



There is a clause in every software reviewer's contract that he must review one isometric arcade adventure every month. That is not to say this game has its place in this month's reviews only because of contractual obligation – it is a good game, if lacking a little in the originality department.

You must destroy the jewel of the Seven Planets, which is the power source of the Spirit of Rasputin. Apparently his spirit lives on despite being shot, poisoned, and generally hacked to pieces. It is the familiar business of going round a maze picking up various objects and avoiding hazards like falling from a very great height, or getting your innards rearranged by any of the various monsters hanging around the place.

Although the maze lacks much of the problem-solving aspects of an Ultimate game – you cannot carry objects, only "absorb" them – it scores in other ways. It is extremely atmospheric. If I was venturing into a Russian mystical folk tale, this is precisely the kind of place in which I would expect to wind up.

Plenty of knights, mythical beasts, rustic machines, and over everything else the brooding presence of the old wizard. That is helped in the Commodore version with a neat rendition of the cossack dance.

Possibly the game's weak point is that it is so difficult to play. It is in 3D and has multiple levels in highly-detailed colour graphics. All this means is that it is very difficult to determine what you have to do to get round the screen. For true arcade adventure fanatics, this is one they will not want to miss.

GRAPHICS ● ● ● ●
SOUND ● ● ●
PLAYABILITY ● ●
VALUE FOR MONEY ● ● ●
OVERALL ● ● ●

MOVIE

► Spectrum ● Imagine ● Arcade Adventure ● Lee Paddon ● £7.95/£8.95

GRAPHICS ● ● ● ●
SOUND ● ● ●
PLAYABILITY ● ● ●
VALUE FOR MONEY ● ● ●
OVERALL ● ● ●



I was in a computer game. So what, I had been in tighter spots before. I looked round the office – fancy decor, pot plants, desk, chairs, all very tasteful. A note on the desk said I had to get a tape from the mob's HQ, get back here, in one piece, and play the tape. After reaching the street, I soon discovered there was much more the note didn't tell me, like the joint was jumping with the mob's heavies. I found a gun, the heavy weight in my pocket made me feel better. No more finger in the pocket stunts. I still had to visit my old friend Bugs Malloy. Not having a street map does not help when all the streets and apartments looked the same.

I was getting nowhere and then I met the girl. She told me her name was Tanya. She said she would show me the way to the hide-out. Following Tanya was the kind of work I could get to enjoy and, anyway, she was my only lead. I was getting close; you could cut the atmosphere with a knife until some guy in the second row of the circle crunched his sweet paper. I had to think fast, some of the goons could be bought, others fooled or, when that failed, I always had the automatic.

While I was busy with some gooks, I lost sight of Tanya, and when I caught up with her, I noticed a subtle change. After she had led me into the third ambush, it all fell into place. This was Vanya, the twin sister, one of Bug's molls. I have never shot a girl in cold blood before; it seemed a hell of a waste somehow.

So by the end of the final reel I had the tape and, of course the girl. My advice to you is to visit your local computer dealer and get into your own *Movie* – this one is mine.

SPIN DIZZY

► Amstrad ● Activision ● Roll About ● Lee Paddon ● £9.95 Cassette £14.95 Disc

It would be tempting to say that yet another software house has had the courage to release a Mad Marbles clone. That would scarcely do this effort from Activision the justice it deserves. *Spin Dizzy* is a fast, addictive, version of the arcade rave.

You control Gerald, or Geographic Environmental Recce and Land-mapping Device if you prefer. He can take the form of an inverted pyramid, ball, or something which looks a bit like a gyroscope. It is screen-orientated rather than scrolling, but Gerald's motion and height is transferred faithfully from screen to screen, all 389 of them.

The object is to roll old Gerald round picking up all the crystals. You do not have a set number of lives but rather a time limit, which is increased every time you collect a crystal or enter a new screen. You lose time by falling a long way or drowning. There is a map option which allows you to see where you are going and what parts of the maze you have visited.

So far, you might think, nothing to raise it above the glut of such games, but what makes this game stand out from the clone crowd is the beautiful graphics and the facilities thrown in with gay abandon. The maze is intricate with a large number of lifts, yawning chasms and switches. Before using a lift, you must run over the required switch to activate it. Some switches also change the layout of the room.

A particularly pleasant sequence of screens is called "bouncing your way to the moon".

Not another tacky, quick Spectrum conversion, this is written specially for the Amstrad, and it shows. Beautiful, vivid colours and fast animation made it one that every Amstrad owner will want to add to his collection.

GRAPHICS ● ● ● ● ●
SOUND ● ● ●
PLAYABILITY ● ● ● ●
VALUE FOR MONEY ● ● ● ●
OVERALL ● ● ● ● ●



FLYER FOX

► *Spectrum ● Bug Byte ● Shoot-em-up ● Lee Paddon ● £2.95*

OVERALL ● ● ● ●



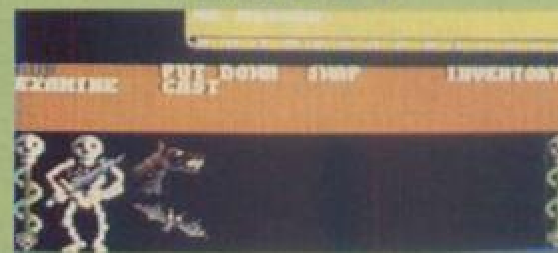
Sufficient time has passed since the shooting-down of the Korean Jumbo jet for this game to seem in reasonable taste. Your task is to protect your large, lumbering Jumbo from the onslaught of swarms of marauding enemy fighters. Controls are simple – four directions and fire. Just get the fighters in the sights and fire when the computer tells you.

When you succeed in polishing-off one raid, another follows until eventually they manage to inflict sufficient damage on old Jumbo to shoot it down. Good, simple straightforward shoot-'em-up, of which some people never seem to tire, and good value.

MASTER OF MAGIC

► *CBM64 ● Mastertronic ● Arcade Adventure ● Lee Paddon ● £2.99*

OVERALL ● ● ●



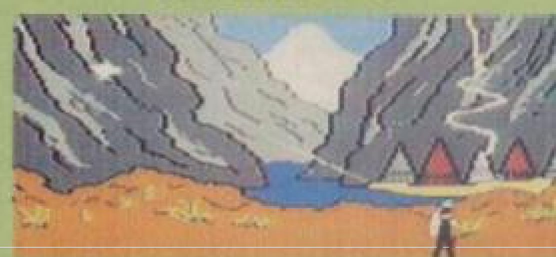
An unusual approach to an old theme. More an adventure with graphics than a platform game with problems. Richard Darling gets his second bite at the Mastertronic MAD label and it is a real departure from The Last V8.

The display gives you a plan view of your position in an underground maze. There is also a window for messages and two other area show your options and pictures of objects in your vicinity. While all very pretty, what the game boils down to is tramping round mapping the maze, grabbing anything you can lay your hands on, and killing things. Still, t is good for the price.

KANE

► *CBM64 ● Mastertronic ● Shoot-em-up ● Lee Paddon ● £1.99*

OVERALL ● ● ●



What do you do with four computer games which have, shall we say, seen better days? Dust them off, thread a lose theme between them and put them out on one tape is the answer of Mastertronic. The result is Kane. Two 2D shoot-'em-ups sandwiched between a horse-leaping-over-things game. All good, clean fun and the graphics are rather pretty but it is scarcely state of the art. Still, you could do far worse for £2.

The first game might receive a mixed reaction from twitchers – it consists of drowning ducks with a bow and arrow, just to show the Indians that you heap big white fellow.

ZOOT

► *Spectrum ● Bug Byte ● Platform Game ● Lee Paddon ● £2.95*

OVERALL ● ● ●



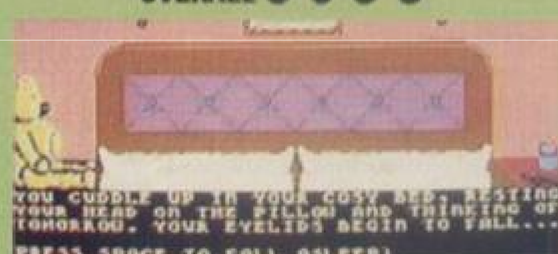
So you thought the platform game was dead? Not so according to Bug Byte. This manages to squeeze yet more permutations from an old favourite. You have to zip round the screen moving around pieces of platform, beating-up Goopa's, ringing bells and so on. The tone of the game is ight-hearted and even features synthesised speech – "Oh Zoot", the machine shouts with the demise of your last man.

There are four platform levels on each screen, each platform consisting of up to eight segments which can be moved around by hero *Zoot*. Not exactly original stuff but reasonably addictive.

ZZZ

► *CBM64 ● Mastertronic ● Adventure ● Lee Paddon ● £1.99*

OVERALL ● ● ● ●



Until recently it has been easy to dimsiss games in this kind of price range as play-once-and-forget games. This game, however, looks and plays like its full price competitors. Using the latest user-friendly icon-driven techniques, it is a traditional text adventure with some well-drawn graphics.

You start in bed and then drift into the land of dreams. All the usual options are available via icons and you can also enter text from the keyboard. The puzzles might not give too much difficulty to the aventure afficianado but it is certainly an excellent, easy-to-use introduction to the genre and remarkable value.

SPELLBOUND

► *Amstrad & Spectrum ● Mastertronic ● Arcade Adventure ● Lee Paddon ● £2.99*

OVERALL ● ● ● ●



Latest in the Mastertronics new MAD range, this is a stylish implementation of the good old arcade adventure genre.

As soon as you hit the fire button, you are presented with a menu giving you various options. Along with old favourites such as pick-up, drop, examine and read, are such bizarre options as Teleport and take lift. This dungeon into which your knight is trapped is certainly keeping up with the latest trends in technology. The whole thing is menu-driven and information appears in windows all over the place. Well-presented, it seems certain to be another big hit for Mastertronics.

GAME KILLER



This is undoubtedly a revolutionary approach to games-playing which could well save lives – your lives. Walk through a hail of bullets unscathed – nothing can stop you once you strap on your Game Liller. That, of course, always assumes that the game uses sprite collisions to find whether you live or die in any encounter on the screen.

Game Killer is in a smart A5 case with a single sheet of simple instructions on the back. Inside is a cartridge with a single button on the right-hand side. You put the thing into the cartridge socket, and you are away. On powering-up, you get the Game Killer title screen, press the space bar and you are back into Commodore Basic. Then you follow normal loading procedure. Once the game is running and you have had enough of being killed, hit the button on the cartridge and there are no more nasty accidents. You can move about the game area at will.

This kind of thing will definitely go down well with people looking for street credibility – "Mind you, if you think that is difficult just wait till you get to the nasty pink dragon and the shower attachment" kind of stuff.

The cartridge can operate in a number of modes. If you press the button, all sprite collision detection is disabled. That usually means you cannot be killed but it is rather disappointing that you cannot kill anything, and often cannot pick up things and generally make progress. To cope with that, there are two other modes.

If you push forward on the joystick while pressing the button on the cartridge, only sprite-to-sprite collisions are disabled. If you pull down the joystick when you press the button, only background sprites are disabled. You can also turn on all sprite collisions again by pressing the cartridge button and holding down the fire button; you should be careful not to do that while in an "illegal" part of the game, i.e., a part you could reach only by using the cartridge.

The only slight cloud on the otherwise sunny horizon is that you must not expect this device to be a universal panacea for all your gaming woes; some games do not use the hardware routines to control game play. Chart-toppers such as *Uridium*, *Rock and Wrestle* and *Elite* will not respond to the treatment. It may also be handy for games designers attempting to debug games. The device could be used to move around the game searching for potential troublespots.

Game Killer is an interesting idea, pleasantly executed, the kind of thing which begs the question "Why didn't anyone think of it previously?" Be careful that if there is a particular game you have in mind, it is suitable for it. At £14.95 it is the kind of gadget no games fanatic will want to be without.

AMSTRAD COMMS PACK

Hardened communications enthusiasts are more than likely to pour scorn on the performance of acoustic-coupled modems. This 'knee-jerk' reaction to the idea of using an acoustic, rather than hard-wired, direct-connect modem, fails to acknowledge that there are some advantages to an acoustic data link. One of them is portability but in the case of the Cirkit communications pack for Amstrad CPC computers, the main advantage is that of price. For less than £40, Cirkit will provide an interface to the computer, an acoustic modem and a suite of communications software supporting both Prestel and Terminal modes.

The modem which forms part of the comms pack was the design marketed by Protek until that company ran into difficulties towards the end of last year.

The modem unit is battery-powered – two AA size batteries are fitted in each end of the unit – design which offers two modes of operation – 1200/75 baud for use with commercial databases such as Prestel and Telecom Gold and 1200/1200, a mode which can be used for the exchange of data between two computer users.

The required mode is selected by a three-way slide switch, the third position being off. The cups of the modem are designed to offer a snug fit when used with a traditional telephone handset. The modem will work with more modern telephones, although is not compatible with one-piece handsets. Connection to the computer interface unit is by way of a five-pin 180° DIN socket.

The interface unit plugs into the expansion port on the Amstrad computer; a through connector is provided so that additional peripherals can be used in conjunction with the interface. Having plugged the interface into the computer and modem, the cassette-based software may be loaded into the computer.

The software is menu-driven, with each selection from the main menu offering a series of sub-menus to select the precise mode of operation required. When the software has loaded a top menu will offer one of five options – Prestel mode, Terminal mode, Receive file option, Send file option and Exit.

Selecting Prestel mode allows the user to select one of two screen modes. Mode 0 allows all eight colours to be displayed, yet results in a reduced text definition in some cases. For that reason Cirkit has provided a Mode 1 option with a restricted pallette of colours – four are available – but an improved definition for text displays. Some of the computer keys are re-defined in that mode to make operation with Prestel easier. For example, the enter key produces the much-used Prestel hash '#' character. The prestel emulation is, considering the price of the package, of good specification and should cope with most users' requirements. The Prestel mode also provides the user with the useful facility of being able to store a page for later viewing while off-line.

In terminal mode the sub-menu allows the user to configure the computer for communication with remote computers operating to different protocols. The user may select baud rate; the software offers 1200/1200, 300/300 or 1200/75, although the hardware does not support 300/300. The number of data bits, parity, number of stop bits and echo may also be specified. The sub-menu also allows one of three pre-defined modes to be selected – BT Gold, Easylink, and a bulletin board mode.

In terminal mode the user should be able to get on-line to any of the ever-increasing number of commercial data services, although as many private bulletin boards still operate at 300/300 they will not be accessible.

The final comms modes are provided for the exchange of data between two computer users. That takes place at 1,200/1,200 baud and supports a basic form of error-checking which will verify that a transfer of ASCII data is error-free.

The Cirkit comms pack offers value which is difficult to beat. If you feel you are being left out of the comms revolution but do not want to spend much money in the process of getting on-line, this is the pack for you. Bear in mind, though, that in addition to the modem and interface you will have to budget for subscription to Prestel/Micronet if you are to make the most of the modem.

Cirkit Distribution, Park Lane, Broxbourne, Herts, EN10 7NQ. Telephone (0992) 444111.

Brother M-1509 printer

Following last month's look at the up-market Epson FX-10S, Jason Ball looks at the equally expensive Brother 1509 NLQ printer.

On July 23, 1985, the first British electronic typewriter was produced by Brother. Later that year the company took a bold step into the medium-priced dot matrix printer market, introducing the M-1509. Capable of 180 characters per second and featuring near letter quality printing, the 1509 has tractor feed and supports 136 columns – perfect for spreadsheets or draft reports.

Released in December, the 1509 will have to compete in a sector of the market already dominated by the likes of Epson, Canon, Juki and Kaga. In terms of specifications the obvious rival to the 1509 is the Epson FX-105. Both take the same width of paper but the two printers are very different. The Brother 1509 is ironically compact compared to its daisywheel printers, attributed, perhaps, to developments like the TC 600 miniature word processor.

Chinese puzzle

In comparison the Epson FX-105 printer is 30mm. taller, 49mm. deeper and 104mm. wider, so it would take up 6,000 sq. cm. more desk space. Unfortunately, that advantage is marred by the Brother's complexities; like some kind of Chinese puzzle it has about 10 detachable parts which are susceptible to loss or damage.

In use, the 1509 performs like a dream. Five push-button controls, situated on top of the printer, are used to select On Line, feed the paper and choose NLQ or draft printing. The final button selects the type of paper used, with three modes for continuous form, single sheets or a cut-sheet feeder. That obviates the need to change the dip switches whenever the tractor feed is removed but the mode must be re-selected whenever the printer is switched on.

The most important aspect, of course, is the print quality and to a lesser extent print speed. In terms of speed, the Brother has the advantage; at 180cps in draft mode it is 20cps faster than the FX-105 and 13 characters faster when printing correspondence (NLQ) at an impressive 45cps.

Unfortunately in obtaining that extra speed sacrifices had to be made and, in terms of print quality, the Epson printer has the edge. Close inspection reveals that dots created by the Epson 18x18 matrix are defined more clearly and fractionally smaller than those of the Brother 9x9 matrix. That makes Epson characters taller and much clearer but leaves each dot visible. On the other hand, Brother's larger, hazy dots are indistinguishable from the characters they create but the resulting character is not as clearly-defined. The result? A word printed in NLQ mode is read more easily when printed by the Epson, although Brother's characters more closely resemble those of a daisywheel, using an old cloth ribbon.

Dual interfaces

The 1509 is slightly unusual in that its tractor feed pushes paper through the printer but that does not present any difficulty. If a fault occurs, the printer stops and a check light appears instead of the usual ear piercing shriek.

Once assembled, the 1509 is neat in appearance but I dread to think what the three-tone colour scheme is designed to complement. One excellent design feature is the accessibility of the dip switches. Situated beneath a small plastic cover, they lie in the path of the printhead, which is moved to one side. Remember that flicking switches with the printer switched on not only risks the electronics – you also risk your fingers.

The manual provided with the 1509 is well-documented and presented but suffers from a non-existent index. It contains both serial and parallel interfaces as standard, one of the only printers to do so. Combined with full IBM and Epson compatibility, the 1509 will work with almost any computer to which you can connect it.

Other features include a facility for down-loadable character sets, although the buffer is only 3K compared to Epson's 8K. It will produce the usual bold, underlined, italic, condensed and enlarged print, as well as proportional spacing, but unlike the Epson they are only software-controlled and cannot be selected manually.

That sorely-missed facility is justified by a slot for one of two printed circuit boards which will control NLQ fonts on added type styles. One of the cards also provides a 16K input/download buffer for extensive character sets. That also saves a good deal of time, storing data from the attached computer and allowing other applications to run while printing continues.

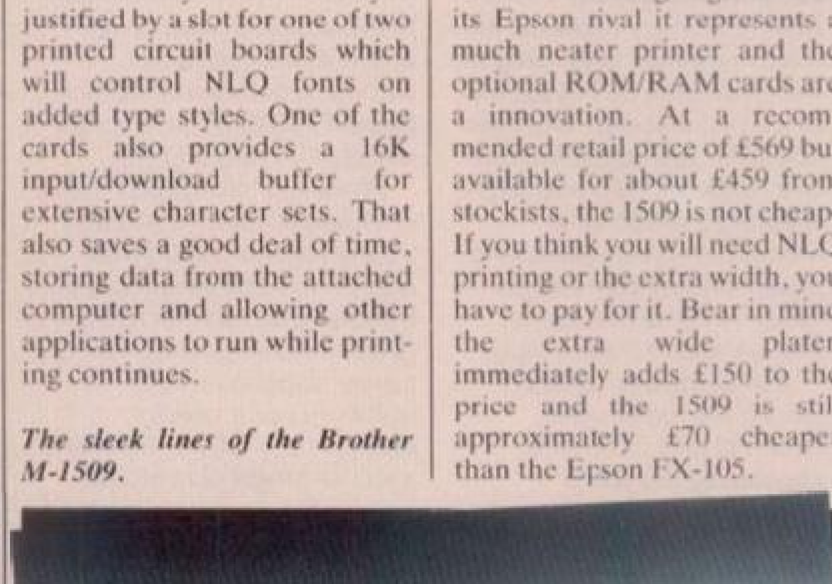
In retrospect, there are comparatively few faults with the 1509. Apart from the criticism of its many pieces, the stationary printer ribbon can be difficult to install. Also the parallel, serial and power connectors are situated on the sides of the machine towards the front, not at the back, so the cables stand out like a cat's whiskers. The only advantage of the unusual design is that continuous form paper entering and leaving the rear of the printer is free from interference.

In terms of features and price, the Brother 1509 is one of the best printers of its kind. Those who have used a spreadsheet or database with a micro will find the 1509 invaluable. It will cope with paper widths as small as any other printer – labels, for instance – yet allow you to get all your finance figures on to one piece of paper. You can even use it to fill in forms.

Quality at a price

The printing quality is reasonably good, if you can cope with the smaller-than-average figures, and the printer design is compact to the extreme. At 4kg. lighter than its Epson rival it represents a much neater printer and the optional ROM/RAM cards are a innovation. At a recommended retail price of £569 but available for about £459 from stockists, the 1509 is not cheap. If you think you will need NLQ printing or the extra width, you have to pay for it. Bear in mind the extra wide platen immediately adds £150 to the price and the 1509 is still approximately £70 cheaper than the Epson FX-105.

The sleek lines of the Brother M-1509.



Atari 1040STF - a powerful perf

***The top-of-the-range 1040STF is just one of Atari's ST family Wheelwright reviews the machine exclusively for* Your Con**

Do you emember the days when 16K used to be the standard memory size for home computers? I can still recall walking into a showroom to look at the Apple II in 1981 and being told that the model had a massive 16KB of memory – whatever they were, they certainly sounded powerful – used the awesome 6502 processor and could be expanded to the truly massive level of 48K. With memories – no pun intended – like those floating about, you can perhaps understand my somewhat bemused attitude as to what is happening with Jack Tramiel's new Atari Corporation as it pushes ever further towards the establishment of 512K and the Motorola 68000 processor as the new hardware standard for machines which sell for less than £1,000.

The company's latest offerings in its ST range – of which it claims to have sold more than 100,000 world-wide – confirm its aspirations to see the world swimming in RAM and processing power. The range starts with the 520STM, which has all the essential characteristics of a £750 520ST – including the 512K RAM capacity, Midi interface, parallel and serial ports, mouse, monitor and floppy disc inputs without disc drive and monitor – but sells for only £399 and can be used with a television set for display.

The next step up is the 520STFM, which bundles a 360K disc drive inside the 520STM for an extra £100. The £499 STFM is expected to be the mainstay of the company's ST sales in the next period as it will provide users with immediate access to disc software, while allowing them, through the use of the TV modulator socket, to delay buying a monitor if they do not have the money for it immediately.

The top-of-the-line machine, to which the other two new machines can be upgraded, although not at present by Atari, is the Atari 1040STF, which offers everything you have in the Atari 520STM plus a 720K internal disc drive and 1MB – instead of 512K – of RAM. It was this machine, expected to be sold with a colour monitor for less than £1,000 and with a black-and-white for less than £700, which Atari provided for review.

Although it is the most expensive of the machines, the other two 520ST machines in the range can be upgraded to 1040 specifications, so you could consider this a review not only of what the 1040STF is but also what the 520STM and 520STFM are and could become. Be warned, however, that Atari does not plan to offer its own upgrade kits right away and you may have to get kits from third-party vendors until it does.

Like the previous ST, all models of the new machine offer the same wide variety

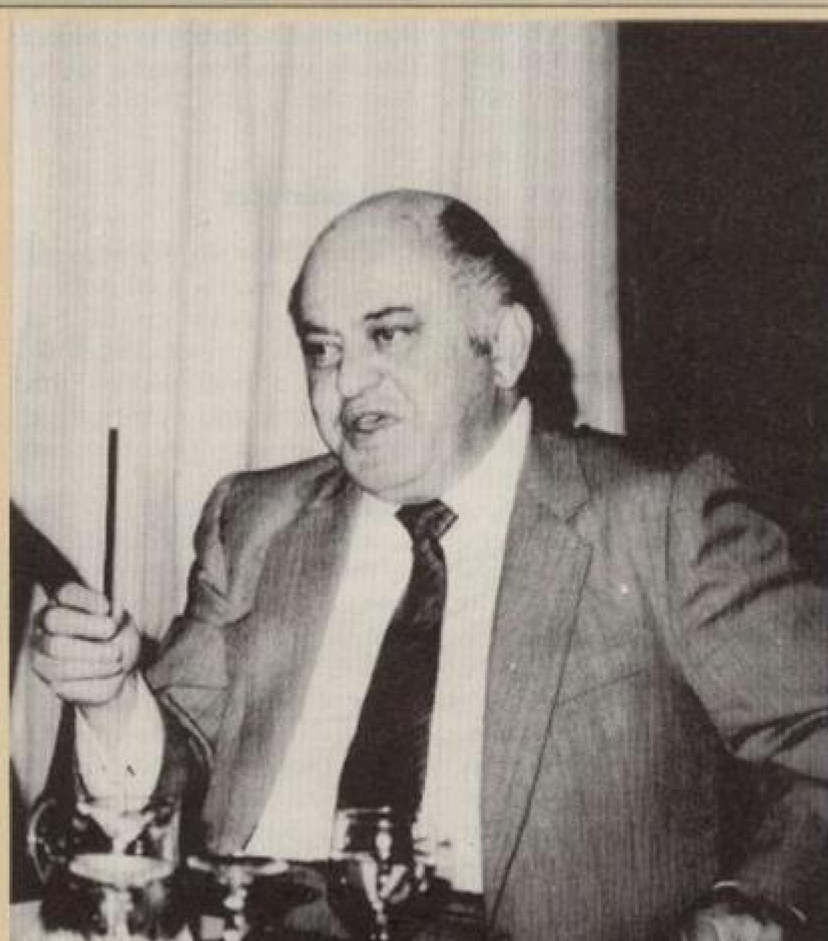
The ST series

Atari has finally released the machine which is to replace the existing 520ST at the top of its 16-bit series. The new 1040STF resides at the top of a range of 1MB and 512K machines which offer Macintosh-type processing power and picture-driven WIMP – Windows, Icons, Mouse and Pointer – input.

Alongside the 1040STF will be the lower-cost 520STM and 520STFM, essentially the same machine but with either less memory or no drive respectively. The latter machines are likely to sell for £399 for the 520STM with 512K RAM, all regular ST I/O ports plus a new TV modulator output – but no built-in disc drive – and £499 for the same machine with a built-in 360K formatted 3.5in. disc drive. The top-of-the-line Atari 1040STF includes 1MB of RAM, a built-in disc drive and is expected to sell without a colour monitor for about £799 and with a colour monitor for about £899.

While the 'old' 520ST – if anything a mere 12 months young can be considered aged – will still be sold as a bundle, with monitor, disc drive, machine, plenty of power supplies and a software pack which includes the GST's *1st Word* and the *Megaroids* arcade game), the company is expecting the majority of users to be buying the new machines.

And since they have more inputs and outputs, the power supply is entirely internal – no large plastic boxes littering the ground – and the RAM capacity is much greater, it is perhaps no surprise that Atari expects the new machines to out-sell the old.



Pictured right – Jack Tramiel, the power behind Atari.

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of inputs and outputs which have moved many people to consider it the new BBC. It offers much of the same state-of-the-art attraction as the BBC did when it was launched, along with a very open and expandable architecture which means that it can be enhanced very quickly and without much messing about. The printer port is of the standard IBM PC type, the RS-232 is an ordinary serial port socket – again a la IBM – and the TV modulator uses a standard cable.

The new machines, however, also offer a minimum of fuss when connecting. As the disc drive is internal – on the 520STFM and 1040STF and an optional upgrade on the 520STFM – and the power supply for both disc drive and the main ST unit have been taken inside the machine, you need only plug in one standard power cable to get the machine going. The mouse socket has been moved from its somewhat awkward position at the side – on the old 520ST – to a new and discreet underside socket and the re-set switch has been moved slightly away from the power switch, so you do not hit it by mistake.

A smooth operator

In operation, the new ST machines are fast. The speed increases are due partially to the inclusion of the operating system – TOS, a superset of the Digital Research GEM operating system – in ROM as part of the ST firmware and, at least on the 1040STF, an increase in memory size. Our test machine also included the new Atari hard disc system and was thus a good deal faster.

The machines are also completely compatible with the existing 520ST, running everything from a pre-release copy of GEM Write – yes, it does exist – to the Atari Megariods games software. We also tested third-party software on the new ST machines, including the Degas paint package and a public-domain comms package from Jeremy San known simply as ST-Term.



Aside from the thankful absence of the external black box external power supplies and the welcome inclusion of an internal hard disc in the main ST unit, there is not a great deal to say about the new ST machines which has not been said about the old. They are the best example of Digital Research GEM in action, certainly faster than any of the implementations on business PCs with the possible exception of one or two IBM AT compatibles, and make a much cheaper introduction to iconic computing than the Apple Mac.

Ironically, it is probably sales of the BBC, more than the Mac or even the Amiga, which will be affected by the new ST machines. With a price of less than £500 for a machine with 512K of RAM and a built-in disc drive – let alone a full windowing environment, mouse and all the expansion ports you could ask for – the ST must look like a good buy, particularly against the ageing BBC. Like the Acorn machine, the ST has a strong base of programming languages from which to choose and it has the standard expansion sockets which will endear it to many third-party software manufacturers.

A machine for the eighties

You should also consider the new ST as something which might take some of the glitter from Amstrad offerings. While the Amstrad machine will give you something which plays good games on a disc drive in colour for £399, for only £100 more the ST will provide you with access to a very modern-looking machine with an increasing library of modern, icon-driven business and entertainment packages, many of them recently converted from the Apple Macintosh.

Admittedly, you will have to use either your own TV with the machine or pay between £100 and £300 for an Atari monitor but the end-product will be something which looks like a machine which belongs in 1986, not a hotted-up version of a three-year-old CP/M design.

The only real criticisms invited by the new Atari machines is the software base. Standing at slightly more than 100 titles, the ST range pales against the 5,000 or so available to users of the Sinclair Spectrum; it really depends on what you want to do with your machine.

One to watch

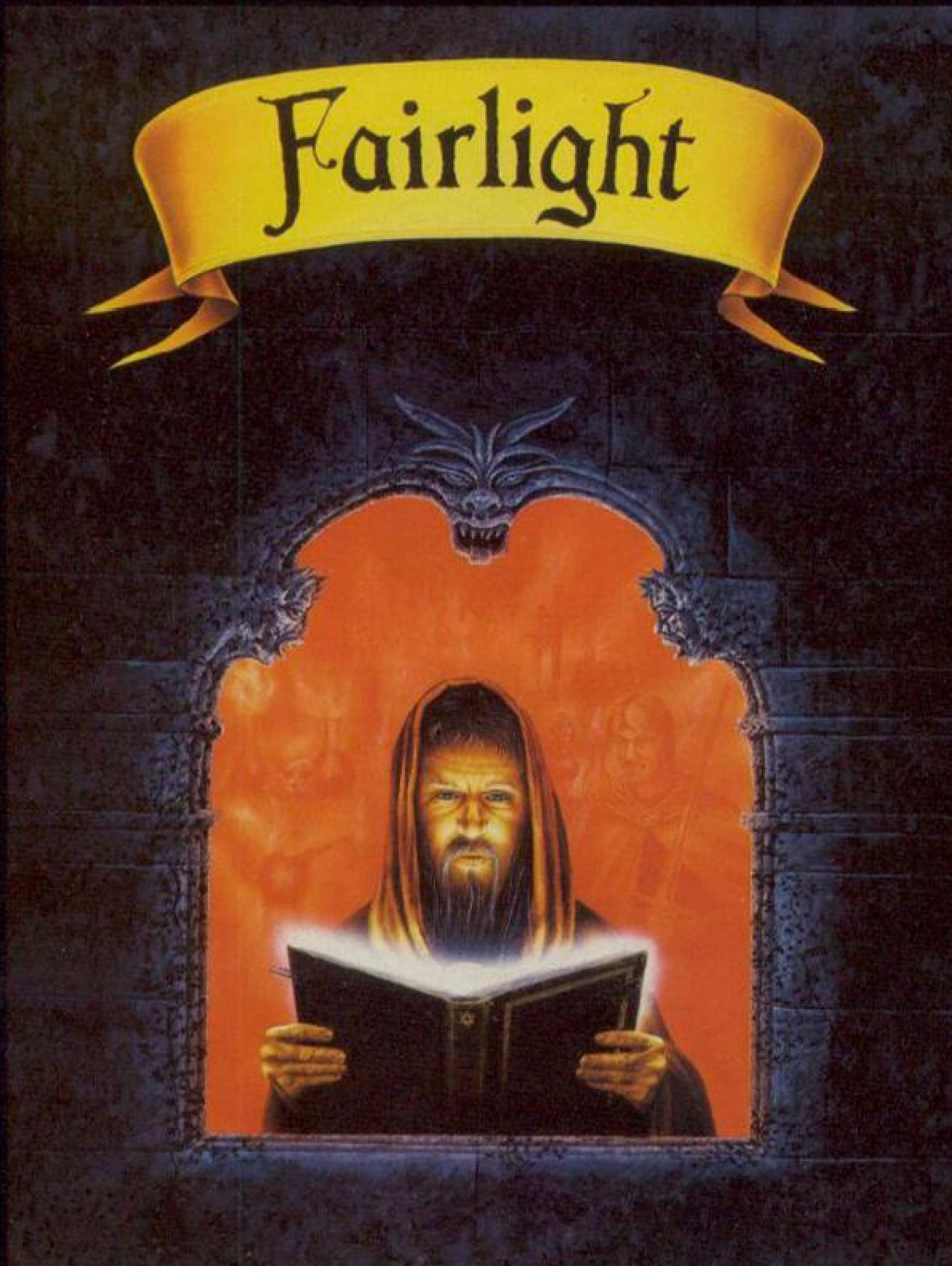
One thing to guard against is the idea of playing many games if you buy the ST with a black-and-white monitor. The Atari has a hard-wired monitor-detection system which can prevent you using colour programs properly on a black-and-white screen and vice-versa. For example, to use the Degas paint program you can load only colour pictures on colour monitor and black-and-white pictures on a monochrome display. More important, 80-column business software does not look too good when used on the 40-column colour display.

Overall, however, the new ST machines look like an excellent buy. It is a pity the upgrade kits between 520STFM/520STM and 1040STF will not be available immediately from Atari but enough third-party houses should rush in to fill the gap so that no-one who buys one of the cheaper Atari STs need worry they will not be able to upgrade.

48K Spectrum

NOW! C64/128 AND MSTRAD/SCHNEIDER VERSIONS

chronicles of the land of fairlight
1. a prelude: the light revealed



BY BO JANGEBORG

(author of 'The Artist')

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Your Spectrum, November 1985

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". . . one of the ten best programs ever made for the Spectrum."
Popular Computing Weekly, October 1985.

". . . the best arcade adventure of the year."
Your Spectrum, November 1985

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MONITORS – A SIGHT FOR SORE EYES

While most micros can display their output on a TV set, adding a monitor will give a much improved image.

You would think with all the monitors on the market that all you would have to do would be to compare prices, choose one which suited your budget, and your opinion of the manufacturer and reach for the credit card. It is not so.

For a start, you have to decide whether you need a monitor at all, rather than auntie's second-hand black-and-white portable, and then you have to find whether the classy colour job on which you have your eye works with your micro. If it does, you need to determine whether colour is best for the uses to which you put the micro and only then you can start agonising over price.

Monitors are exceptions to the rule that you get what you pay for and most expensive is not necessarily best. It may even be useless and the only way to ensure that it is not is to match the technical specification of the monitor to the specification of your micro.

Obviously, if you buy a monitor designed by the maker of your micro for its own customers there is no difficulty. Commodore, Enterprise, Memotech, the MSX companies and even Sinclair for the QL all market monitors for their micros but if you want independence the choice is bewildering.

The first rule is do your homework and also seek advice from a reputable dealer. Do not listen to the man next door who has that really good model he does not want and is sure can be made to work with your machine if you just wire this cable to that socket – and pray.

Consider carefully why you need to buy a monitor anyway. After all, television sets of whatever description tend to be cheaper than the equivalent monitor and if you are an intermittent or very infrequent user, it probably does not make sense to spend more than you need to do.

If you have one of the less popular micros – e.g., Memotech MTX, Sinclair QL or Tatung Einstein, and there are others – certain television sets cannot accommodate the left side of the screen display adquately, which is an excellent way of ruining both eyesight and enjoyment, and an urgent incentive to buy a monitor.

Second, if you do a good deal of word processing, text will be difficult to read on a colour television set and may be poorly focused on a black-and-white version. A monochrome monitor gives much sharper definition and is less tiring on the eyes. Monochrome may be either black and white, green or amber screen and it is very much a matter of personal preference, although you may pay a few pounds more for an amber monitor than for a green screen.

What to look for

Again, if you own a BBC, you may well be into icons, windowing and mice. To get the best from them a monitor is something of a necessity and when you get into computer-aided design and graphics packages generally, a television cannot do justice to your efforts. In fact, with the increasing sophistication of software – the AMS Pagemaker and MirrorSoft Fleet Street Editor come readily to mind – 1986 could be the Year of The Monitor. Here is a checklist of points to consider:

Resolution, which is determined by the number of pixels – triads for colour screens – which can be fitted-in horizontally across the screen. The more there are, the higher the resolution and the more expensive the monitor. This reverts to why you want a monitor in the first place – incessant games players can probably manage comfortably with low resolution, advertised by the trade as "standard resolution" and there is little point in buying a high-resolution monitor if your computer supports only a low-resolution screen. As a rough guide, the Spectrum, Commodore MTX and MSX machines need at least 300 pixels across the screen, the BBC and Electron 600, and the Enterprise, Atari 520ST and Amiga, when it arrives, need something more than 700.

Those who dabble with text and numbers as well should look to medium resolution from the outset. Low-res on 80-column word processors, for example, tends to make Ws look like Us and tints letters all the colours of the rainbow.

High-resolution colour is required only by the expensive end of the computer market, e.g., Atari, IBM compatibles and the like. The exception is the Enterprise, which has a configuration which includes one high-res mode, although the micro is inexpensive.

Make	Model	Size	Signal	Resolution	RRP	Special Comment
Colour						
Microvitec	Cub 452	14in.	PAL/TTL	Std.Res	£279	Model 452/1431/M2 will run on Spectrum
Microvitec	Cub 653	14in.	PAL/TTL/Audio	Med.Res	£345	
Philips	CM8524	14in.	PAL/RGB/TTL/Audio	Med.Res	£280	
Philips	CT2007	14in.	UHF/RGB/Audio	Std.Res	£220	Dual TV/Monitor
Ferguson	MC05	14in.	UHF/RGB/Audio	Std.Res		Dual TV/Monitor
Hantarex	CT900D1SR14	14in.	PAL/Audio	Std.Res	£297	Suited to the Commodore 64
Mitsubishi	XC1404	14in.	RGB	Med.Res	£287	Brightness & Contrast added by Opus
Sinclair Vision	QL	14in.	RGB	Med.Res	£299	Made by Taxan for Sinclair
Monochrome						Spectrum 128 compatible
Crofton	PM101	9in.	Comp.Vid	High Res	£83	Small-size monitor
Philips	BM7502	12in.	Comp.Vid/Audio	High Res	£88	Anti-glare screen, amber phosphor
Hantarex	Boxer	12in.	Comp.Vid	High Res	£99	Audio is £4 extra

Many major manufacturers, such as Sony and Hitachi, produce combined TV sets and monitors. If you decide to buy such a combination TV/monitor the best advice is to visit your local hi-fi dealer or discount store and ask them to demonstrate the models they have available.





Pictured right above is the display produced by a monitor. The picture below right shows that the results from a TV set are inferior.

Monochrome monitors, incidentally, are invariably high-resolution.

Sound: check that the monitor is wired for sound. If it is not and the micro does not have on-board loudspeakers or cannot be plugged into a hi-fi, your micro will be mute.

Signal connections: different micros emit different types of signal. At the lowest level, PAL, composite signal, means the monitor needs extra circuitry to recover individual colours from the signal. The specification of your micro tells you which signal it transmits. PAL may not give the sharpest colour but when hooked to a domestic video, it enables you to tune into TV channels.

Next level

The next level is RGB and TTL, which again require a different monitor. The signal is clearer than with PAL, so the screen image automatically is better. Dual TV/monitors allow you to switch from RGB to PAL and down to UHF, the standard TV signal. Made by Ferguson and Philips, they are worth considering.

Cosmetic: anti-glare and frosted glass relieves eyestrain and costs more. That could be a serious consideration for heavy users but is not on offer for most of the cheaper range of monitors.

Price: A standard monochrome monitor should not cost more than around £80, although amber screen will cost a few pounds more because of the cost of the chemical which produces the amber colour.

A medium-res colour monitor could cost around the £300 mark and a dual monitor can cost as little as £220, according to where you buy it. There is only a limited number around at the moment, so it should not be difficult to identify a good price – *Mary Sargent.*

MICROVITEC 1451 DQ3 CUB

For the increasing number of micro owners, choosing a colour monitor can be difficult. One of the long-time leaders in providing monitors for the BBC is Microvitec, which also recently entered the market for purpose-built monitors which can be used with the Sinclair QL and IBM PC.

The latter fact is interesting, as there are only two monitors designed to cope with the infuriatingly non-conformist QL 85-character screen and one of them is the Microvitec 1451/DQ3 Cub. The Cub can be used with a variety of other micros, including the BBC, although it is designed primarily to rest alongside the Sinclair Super Micro.

The 1451 is black, streamlined and very smart, complementing the modern shape of the QL. Provided with its own tilt/swivel stand, the screen is raised above the computer and can be positioned at the best possible viewing angle.

On the technical side, the monitor incorporates RGB and TTL input with a good bandwidth of 18MHz and an astonishing tube resolution of 653 pixels horizontally and 585 vertically. The RGB port allows you to connect it to almost any computer – we used it extensively with the BBC micro – but it produces a slightly narrower screen than normal because only 80 of its 85 columns will be used. Screen width is 14in., measured across the screen corner to corner.

Situated behind the front cover is one brightness control. That is a poor aspect of the Cub, because it leaves so little control over the screen. To look at, however, the Cub is an excellent monitor, completely flicker-free and intense both in colour and clarity.

Horizontal tube resolution is 653 pixels, more than most other monitors in the same price range, and perfect for hi-res modes. Bandwidth is 18MHz and the anti-glare CRT is built into the cabinet.

At a recommended price of £269, the Microvitec 1451/DQ3 Cub is an excellent and flexible monitor which will work well with a variety of micros, including the idiosyncratic QL.


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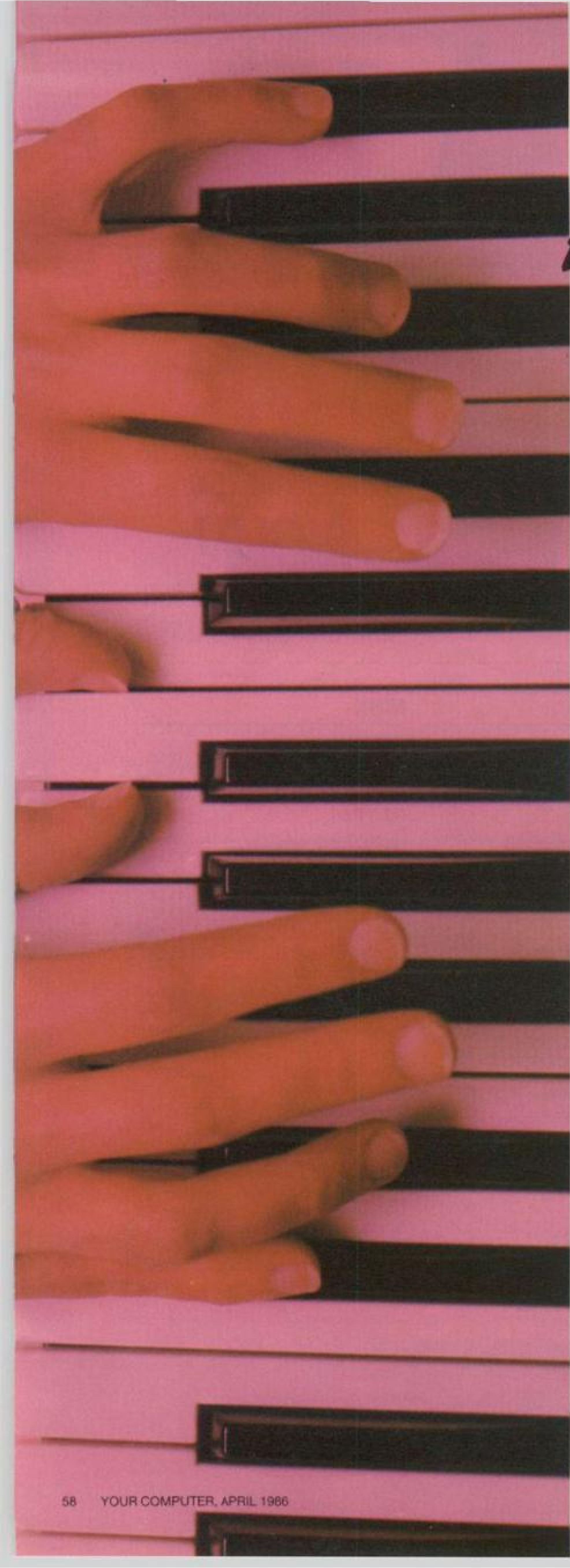
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Almost everyone enjoys making music, although some do it more tunefully than others. That basic human instinct could help to explain the dramatic growth of interest in music-making on home computers in the last year.

The interest has been reflected in the arrival of several sophisticated music software packages and, in particular, in exciting developments in music peripherals for home micros. Some of the add-ons exploit the musical abilities of the built-in computer sound chips, while others put external sound-making devices under computer control.

Perhaps the easiest way to turn a micro into a musical instrument is to use a musical keyboard to control the outpourings of the built-in sound chip, if the micro has one.

The simplest external keyboards are those which rest on top of the Qwerty keyboard so that pressing a musical key operates a Qwerty key below it. Software translates those key-presses into appropriate musical commands to drive the sound chip.

Starting point

The keyboards have the attraction of providing a cheap starting-point for exploring the musical potential of your micro. The keys necessarily are small and the range is limited to about two octaves – without resorting to software octave switching – thus restricting their musical usefulness.

Best-known of the clip-on keyboards is the Commodore £14.99 Music-Maker for the CBM-64. It has recently been joined by a version which accommodates the different-sized keys of the 128.

The only rival clip-on keyboard for the Commodore 64 is from the Italian synthesiser maker Siel. Like the Music Maker keyboards, the Siel £19.99 CMM 25 is complete with the software needed to convert the key-strokes into musical commands.

To date, the Commodore machines are the only micros for which clip-on keyboards have been produced but the Amstrad machines and the Spectrum 128, with its newly-found musical voice, must be candidates for future peripherals of this kind.

Moving up the price scale and away from the Qwerty keyboard, various free-standing musical keyboards are available to plug into micro orifices. Again Commodore machines dominate that market but there is also one keyboard designed to operate with the sound chip of Acorn BBC computers, the ATPL Symphony keyboard which has four octaves of full-sized keys and is supplied with software defining up to 100 sounds.

For the Commodore 64/128, Siel produces a £125 four-octave keyboard with full-sized keys, the CMK 49. In addition to supervising the SID chip, the software with this package also allows the keyboard to control synthesisers and other electronic instruments equipped with Midi ports through an optional Midi interface.

Another four-octave Commodore keyboard is available at £99 from Microsound. Two slider controls at the side of the Microsound 64 keyboard allow musicians to adjust SID parameters as they play the keyboard. The Microsound software includes a sequencer which will store up to 200 notes for each of the 64's three voices.

Commodore's competition

In addition to controlling SID, the Microsound keyboard can also be used to control a sound sampling system marketed by the company.

Both Siel and Microsound face formidable competition from Commodore, which has just introduced a five-octave keyboard at the attractive price of £79.95. It is part of the range of musical hardware and software being developed for Commodore machines by music publisher Music Sales.

The software provided with all the keyboards mentioned so far is intended primarily to drive the internal micro sound chips, but those chips have their limitations, both in the quality of sound and the number of channels available.

Music add-ons for your micro

Tony Sacks reports on the wide variety of non-Midi musical add-ons for the leading micro computers.



The three-channel restriction of most micros is more severe to serious music-making than many people realise. Although it can provide a satisfying melody line with a two-note chordal accompaniment, it means that the notes usually do not have the chance to die away naturally as they would in an acoustic instrument.

In a three-channel micro chip, sound channels are continuously being "robbed" so that they can play new notes. That is a major factor in the "un-naturalness" of which many listeners to micro-produced music complain.

Professional music synthesisers often have 16 or more sound channels, not because musicians are likely to have that many fingers but because the extra channels allow old notes to linger as new ones are played.

Sound expanders

The three-note limitation is one of the reasons the various sound expanders on the market can add so much to the quality of the music generated by home computers. One of the first, and still one of the most impressive expanders, was the Hybrid Technology Music 500 for the BBC machine. It offers up to 16 channels of sound spread across a stereo field, each channel capable of producing a different sound.

The Music 500 system has been expanded appreciably with the arrival of the Ample music programming language in ROM form.

Siel has an expander for the Commodore 64/128 based on a home organ chip. The £99.95 device, the Sound Buggy, provides a percussive and bass accompaniment as the player picks out a melody on a keyboard of either the clip-on or plug-in variety. If you like the sounds of home organs, it could appeal to you.

In recent months eight-channel expanders for the Commodore machines have arrived from Commodore – in league with Music Sales – and from Toshiba for MSX computers. Both those add-ons derive much of their musical potency from the frequency modulation system of sound synthesis, noted for its precision, clarity and life-like simulation of of a variety of acoustic instruments.

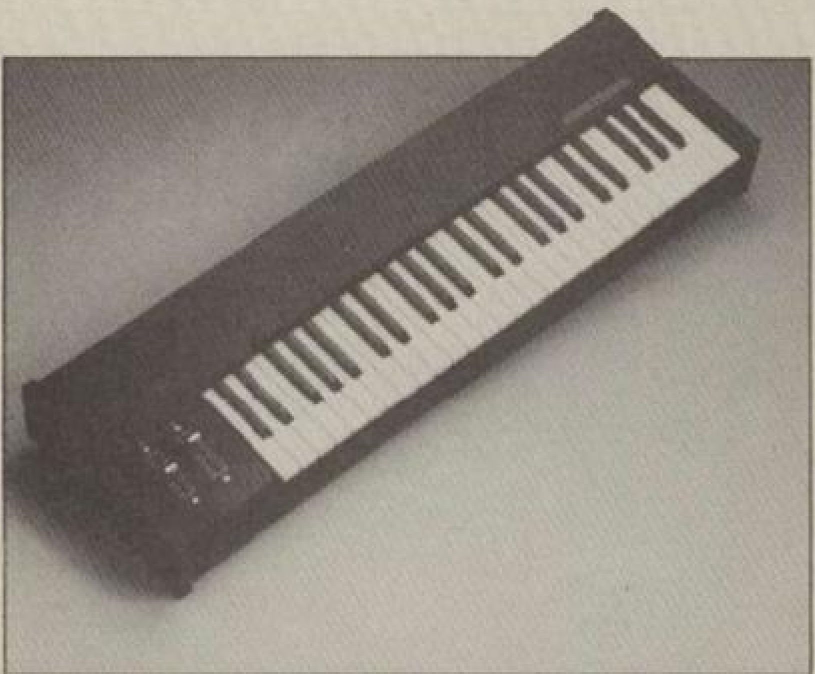
The Toshiba package, confusingly called Music Maker like the Commodore keyboards, includes a four-octave keyboard and software to produce some interesting accompaniments. Toshiba plans for the £269 package seem uncertain and although the system was previewed at the PCW Show last September, it is unlikely to be on sale in the U.K. for several months, if at all.

The Commodore Sound Expander is already available

Continued on page 60

WHAT'S AVAILABLE

Keyboards				
	CBM-64/128	Music-Maker	£14.99	Commodore
		CMM 25	£19.99	Siel
		CMK 49	£125	Siel
		Microsound 64	£99	Microsound
		5-oct keyboard	£79.99	Commodore
	BBC micros	Symphony	£125	ATPL
Expanders				
	BBC micros	Music 500	£70-200	Hybrid Technology
	MSX micros	Music Maker	£269	Toshiba
	CBM-64/128	Sound Buggy	£99	Siel
	Commodore	Sound Expander	£99.99	
Samplers				
	BBC micros	Barry-Box	£79.95	BML
	Spectrum	Sampler	£49.99	Datel
	CBM-64/128	Microvox	£225	Supersoft
		DMS	£195	Microsound
		Sound Sampler	£69.99	Commodore
		Sampler	£49.99	Datel
Drum Simulators				
	Spectrum	SpecDrum	£29.95	Cheetah
	CBM-64/128	Digidrum	£65	Syndromic
		Comdrum	£29.95	Datel



Continued from page 59

and, as pointed out in our recent review – *Your Computer*, February – offers good value. That value has been further improved by Commodore assembling several bundled packages, including the Sound Expander and other musical items.

The other recent growth area for musical add-ons has been in sound samplers and their close relatives, drum simulators. Samplers permit you to use the micro memory to make digital recordings of real sounds which you can play back subsequently at different speeds to achieve a musical effect. Drum simulators provide you with "kits" of digitally-encoded percussive sounds which can be read out of micro memory at regular intervals to produce rhythmic patterns. For a fuller explanation of samplers and drum machines, refer to our survey in December, 1985.

There are already four sampling systems available for the Commodore 64/128 alone, in addition to one each for the Spectrum and BBC computers. The Spectrum sampler is an improved version of the system produced last year by Datel. The company has re-designed the hardware and re-written the software to produce a £49.99 sampler which, it claims, is a vast improvement on the original model.

A new arrival on the sampling scene is the Barry-Box for the BBC computer from BML Electronics of Milton Keynes. Initial details are sketchy but the £79.95 system includes a microphone and software on ROM.

The Commodore samplers split into two, aimed in price and quality at the serious amateur or professional user, and two for the micro owner wanting to experiment with sampling. The two upmarket packages are the Supersoft £225 Microvox digital sound editor and the Microsound £195 Digital Music System.

Both offer the kind of sound quality the serious user expects, as well as the facility to link via Midi to electronic instruments. The Microsound sampler can also be controlled by the company's keyboard described earlier.

The more affordable packages are from Commodore/ Music Sales and Datel. Since the Commodore £69.99 sampler was described in our recent survey – December, 1985 – the company has announced plans to sell it as part of a £?? bundle. The Datel sampler, to be reviewed soon, is priced at £49.99 for the hardware and sampling software. For an extra £9.95 you can have an additional software package which will turn the hardware into a drum simulator. If you are interested only in the drumming abilities, a separate package using simpler hardware than is needed for the full sampler will be marketed for £29.95 under the name Comdrum.

That should not be confused with the similarly-named and priced SpecDrum from Cheetah, which performs similar percussive duties when used with the Spectrum. Although it has been on the market only a few months, the SpecDrum has already become the best-selling Spectrum peripheral after joysticks, and more than 30,000 of the devices have been produced.

Cheetah has just released the first set of alternative sounds for the SpecDrum. For £3.95 you can have a selection of eight crisp Latin sounds and a program which allows you to build a "kit" of sounds by combining those sounds with those in the original SpecDrum software.

Cheetah is now working on an Amstrad version of the SpecDrum, which is expected to cost around £35.

Polyphonic playing

The Datel Comdrum will offer the first competition for the Syntron Digidrum from Syndromic Music which has had the market for Commodore drum simulators to itself for several months. Although the Digidrum £65 price-tag seemed a bargain when it first appeared, the Comdrum will cost less than half as much and will offer real-time rhythm programming which the original Digidrum software did not.

Both drum packages are still bargains compared to the dedicated drum machines costing several hundred pounds.

The next stage in the evolution of sampling systems for home micros could be polyphonic sampling. The samplers described are all monophonic – only one sound can be played back at a time. Polyphonic sampling, in which several notes can be sounded simultaneously, would allow chords to be played and could produce far richer sounds than are possible with monophonic systems.

A polyphonic sampler based on the Apple II computer has already been developed for the professional market, so it should be possible to produce a similar system for the home user based on the new generation of 128K RAM computers.

Although all the Commodore samplers described will work with the C-128, none of them takes advantage of its increased memory capacity to boost their sampling capabilities. It is still early days for the home micro as a musical instrument. If so much progress has been made in little more than a year of serious development, however, the future for micro-based music must be exciting.

ATPL (Advanced Technology Products Ltd.), Station Road, Clowne, Chesterfield S43 4AB. Tel: Clowne (0246) 811585.

BML Electronics, 24 Larch Grove, Bletchley, Milton Keynes. Tel: Bletchley (0908) 640805.

Cheetah Marketing, 1 Willowbrook Science Park, Crickhowell Road, St. Mellons, Cardiff. Tel: Cardiff (0222) 777337.

Commodore Business Machines, Corby, Northamptonshire NN17 1BR. Tel: Corby (0536) 205252.

Datel Electronics, Unit 8, Fenton Industrial Estate, Dewsbury Road, Fenton, Stoke-on-Trent. Tel: Stoke-on-Trent (0782) 273815.

Hybrid Technology, Unit 3, Robert Davies Court, Nuffield Road, Cambridge CB4 1TP. Tel: Cambridge (0223) 316910.

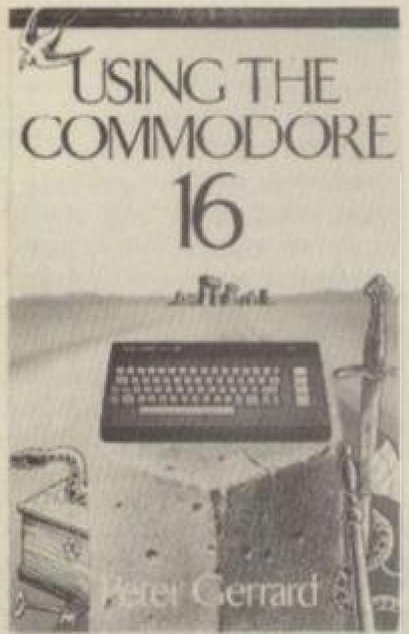
Microsound, PO Box 14, Petersfield, Hampshire GU32 1HS. Tel: Petersfield (0730) 87403.

Music Sales, Newmarket Road, Bury St. Edmunds, Suffolk IP33 3YB.

Supersoft, Winchester House, Canning Road, Wealdstone, Harrow HA3 7SJ. Tel: 01-861 1166.

Syndromic Music (agent for Syntron Digidrum and Siel products), 35A Grove Avenue, London N10 2AS. Tel: 01-883 1335.

Toshiba (UK), Toshiba House, Frimley Road, Frimley, Camberley, Surrey GU16 5JJ. Tel: Camberley (0276) 681691.



Until late last year it looked as though sales of the Commodore C16 computer would fail to reach even the modest levels necessary for the publishers of both books and software to commit resources to the production of titles aimed at the machine. The aggressive pre-Christmas price cuts though stimulated sales with the result that there are now a good number of C16 owners with a thirst for more information on their computer. Many publishers who had been waiting for the C16 to establish itself in the market were caught out by the rapid increase in the user base with the result that there are many titles aimed at C16 owners. Duckworth was however quick off the mark and its *Using the Commodore 16* will be well received by C16 owners wanting to explore the computer.

The book's author, Peter Gerrard, will be well known to followers of Commodore computers – he has written several titles for the CBM 64. His in-depth knowledge of the way in which Commodore approaches the design of its computers is evident from the casual, but informative style that the book adopts. This is a man that knows what he is talking about.

The first chapters of the title cover ground which will be familiar to many C16 users, namely an introduction to basic programming. By chapter five however the reader is being told about the monitor built into the machine's firmware.

All aspects of the C16 get the Gerrard treatment including the colour, graphics and sound facilities of the machine. The book features plenty of example programs, including a listing of a simple, but useful database program.

The four appendices that bring things to an end include a ROM memory map and a guide to the machine instruction set – very useful for the adventurous programmer.

Using the Commodore 16 is a title that packs in a lot of useful information. If you want to get to grips with the machine the book is certainly worth considering.

Using the Commodore 16
Author: Peter Gerrard
Publisher: Duckworth
Softback – 334pp
Price: £9.95



Warning This Computer Bytes made a welcome relief to the heavyweight tomes that are the usual fodder of a *Your Computer* book reviewer. The book is a collection of cartoons by Kipper Williams, who we are told is a young cartoonist who contributes to such august publications as the *Radio Times* and *Time Out*. The shear number of cartoons within the book should mean that most readers will find something to tickle their funny bone. Most people will recognise certain aspects of their behaviour toward computers in some of the cartoon characters. If they do not then a friend or relative is bound to point how your behaviour is reflected in one of the drawings.

Kipper Williams is obviously a computer buff himself and some of the cartoons may be difficult to understand. For example one drawing depicts a headless person sitting at a terminal, his severed head is shown plugged into the rear of the machine. A reference to a wirehead presumably although as this term is hardly common the visual pun will, pardon the phrase, go over most people's heads.

In general though the gags are straightforward and at £1.95 the collection offers good value for money.

Warning This Computer Bytes
Author: Kipper Williams
Publisher: Javelin Books
Softback
Price: £1.95

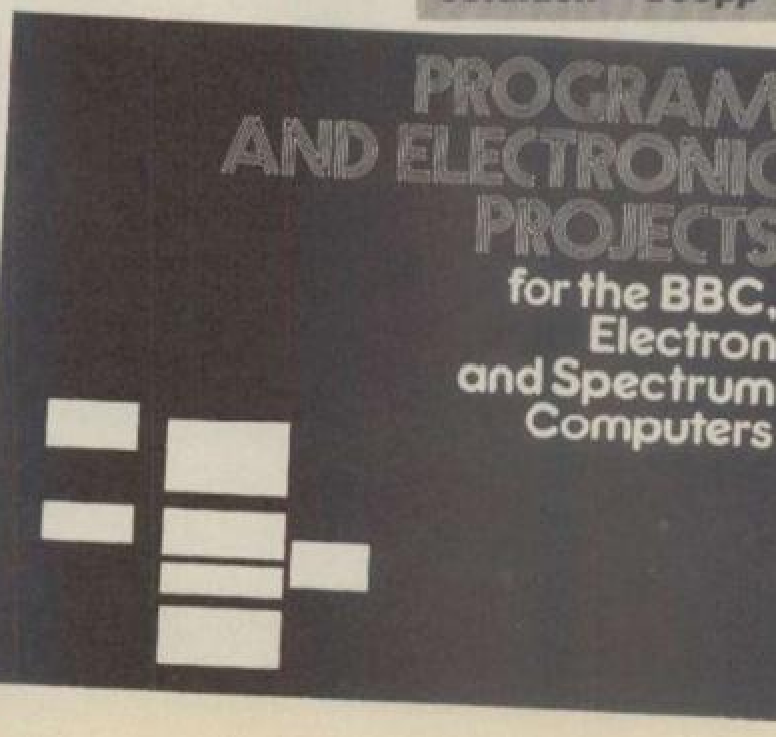
While electronics is not the fashionable hobby it used to be, there are still a considerable number of people beuilding their own electronic projects. A knowledge of electronics is very useful to the computer user as interfacing a computer to the real world needs some external circuitry.

As the title of the book suggests, the reader is presented with a collection of projects that have been divided into two sections. The first presents a series of pure programming for the BBC/Electron and Spectrum computers. Some 30 programs are listed, the majority being related to the subjects studied by any school science student. Each program is fully anotated and is used to illustrate a particular area of programming technique.

The last section of the book introduces some fundamental interfacing techniques including both Digital to Analogue and Analogue to Digital conversion. Full circuits and breadboard layouts of the circuits are given and even if the reader has not held a soldering iron in anger before, the information given should allow working circuits to be quickly assembled.

This is definitely a book for buffs but for those who want to explore both the hardware and software of their computer this book should prove to be a valuable source of information.

Program and Electronic Projects for the BBC, Electron and Spectrum Computers
Author: Graham Bishop
Publisher: Macmillan
Softback – 160pp



Mike Singleton's Lords of Midnight _game fo_
new ground in programming techniques. N
career from the first Singleton game, Space
Eye of the Moon.

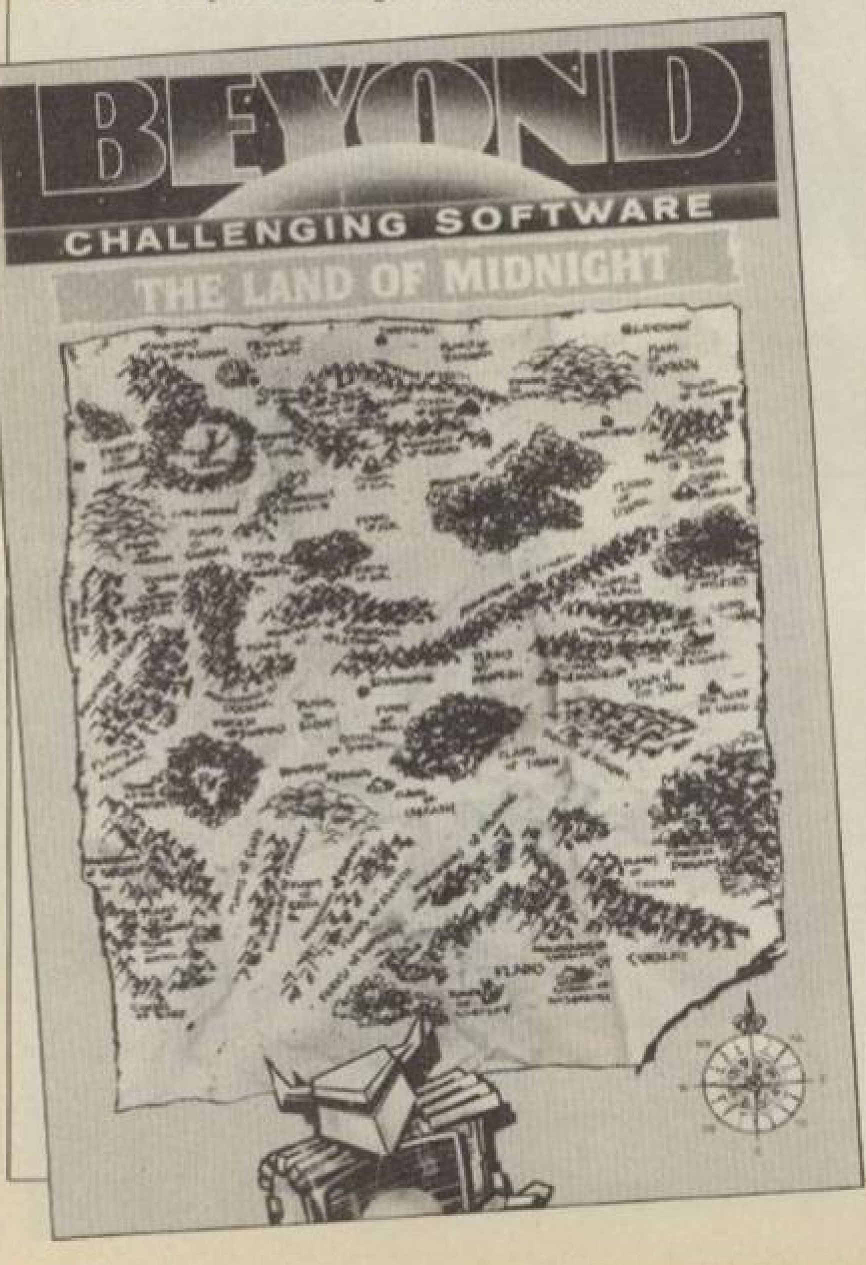
Mike Singleton has been a name to be reckoned with ever since *Lords of Midnight*, a complex amalgam of strategy and adventure game, was released for the Spectrum in 1984. Since then, there have been Commodore 64 and Amstrad versions, plus a sequel with even more locations and characters than the original, plus a new game released just before Christmas which promises to be as successful as its predecessors.

Writing best-selling games is only the latest of the potentially lucrative schemes to have emerged from Singleton's fertile imagination. His current fame and fortune could scarcely have been predicted when he had his first encounter with a computer in 1968. Then a student of theoretical physics at Lancaster University, he was required as part of his mathematics course to learn Algol.

"I hated it," he says. "Those were the computer dark ages when you had to wait for operators to punch in your work. It could be two weeks before you saw the results of even the simplest program."

Having chosen English as an optional subject, Singleton decided after a year to switch courses. He later taught English at a comprehensive school at Ellesmere Port, Cheshire and it was another 10 years before he again set eyes on anything resembling a computer.

In 1978, he was given a Sinclair programmable calculator for his birthday and mentioned the fact to a friend who had a betting shop. The friend soon presented him with a problem – could he use the calculator to work out the payments resulting from horribly-complicated bets such as one called Round the Clock, in which 13 bets are placed on three horses? Singleton rose to the challenge and managed to devise a program which just fitted into the the calculator.



That achievement encouraged Singleton to try to produce a similar program for sale to other betting shops. A TI-59 programmable calculator needed an investment of around £100 – "a lot of money in those days," says Singleton – but was sophisticated enough for him to be able to write programs for compound bets like Yankees, Canadians, Patents and other brain-teasers. The plan was to market complete units of calculator plus programmed tape but, unfortunately, someone else with the same idea beat Singleton to it.

Undeterred, Singleton and his friend settled on an even more ambitious scheme. With the aim of automating betting shop operations completely, they bought a Pet computer and Singleton wrote software which would permit betting shop assistants to input all the horses running that day, all the latest odds, all bets placed, and all the results, leaving the program to calculate the final payments.

A few test runs in his friend's shop revealed a fatal flaw in an otherwise perfect plan. Just before the start of every race, betting invariably reached such a peak that it was impossible to input the amounts quickly enough.

Singleton needed a new plan, so he wrote a race simulator on which punters could bet when weather conditions halted race meetings. The game had realistic odds with a slight edge for the bookie, and horse graphics copied from 19th-century photographs of Edward Muybridge, who tried to depict a horse in motion with a series of stills. The simulator, too, experienced a difficulty – it became a test case and was found not to be within the law. One unit was sold to a betting shop in Ireland, where no such problems were encountered, and as far as Singleton knows, is still running successfully.

It was only a short step to Singleton's first true game, an arcade-style machine code program called *Space Ace* which he wrote without the help of assemblers in about six weeks. "That was very educational," says Singleton, who is still proud of the game's diagonal scrolling and cockpit effects. The game was marketed by Petsoft and sold about 200 copies – "one of its better titles," says Singleton, who recalls in those days sales of 500 were considered excellent.

Soon afterwards Petsoft introduced him to his first ZX-80 and he decided to offer his programming services to Sinclair Research. Invited to Cambridge in November, 1981, he was shown the prototype of a ZX-81 and in the two-week school Christmas holidays he wrote six 1K Basic programs which were later released with the ZX-81 as *Gamespack 1*, earning him the fabulous sum of £6,000. "It was the best rate of pay I had ever had," says Singleton.

Games by telephone

The money was put to good use. In 1977, Singleton has become a devotee of a Play-by-Mail game called *Starweb*, run from Phoenix, Arizona by a company called Flying Buffalo. "You sent $1.75 with your order for star fleets, weapons and other necessities," Singleton explains. "Then it would process all operations on its computer and send you a print-out of the current state of play. About once a month, you had another turn."

Singleton set up his own Play-by-Mail game, the first of its kind in Britain. Called *Starlord*, it had players competing to sieze the throne at the centre of the galaxy. Wherever two players met, Singleton would send them each other's addresses so they could enter into diplomacy. It was run from Singleton's Pet and at its peak

had 800 players, one from as far afield as Papua New Guinea.

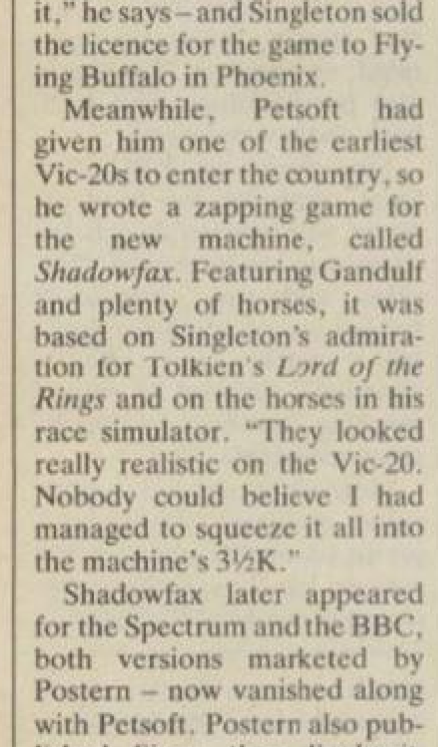
Starlord was soon earning more than Singleton's salary as a teacher – "not very difficult," he adds – so he resigned to concentrate on writing games. Starlord continued to flourish until last year when "a horrendous accident" caused the system to crash while Singleton was making a back-up, wiping-

Beyond Software broke
cole Segre traces his
Ace, to his latest,

out both the original hard disc and the copy. Players eventually were re-imbursed – "they were all very pleasant about it," he says – and Singleton sold the licence for the game to Flying Buffalo in Phoenix.

Meanwhile, Petsoft had given him one of the earliest Vic-20s to enter the country, so he wrote a zapping game for the new machine, called *Shadowfax*. Featuring Gandulf and plenty of horses, it was based on Singleton's admiration for Tolkien's *Lord of the Rings* and on the horses in his race simulator. "They looked really realistic on the Vic-20. Nobody could believe I had managed to squeeze it all into the machine's 3½K."

Shadowfax later appeared for the Spectrum and the BBC, both versions marketed by Postern – now vanished along with Petsoft. Postern also published *Siege*, then *Snakepit*, which Singleton calls "my favourite among my early games."



Next came *3-Deep Space*, Britain's first stereoscopic game, sold complete with blue and red spectacles. "There was a season of 1950s 3D films on television, so I thought it would be fun to try the same thing on a computer game," says Singleton. The proximity of a computer screen, however, meant that slight variations in eyesight could alter the intended 3-D effects of the game's pyramid-studded landscape. "One chap wrote to thank us because playing 3-Deep Space had made him visit an optician and get glasses," Singleton remembers.

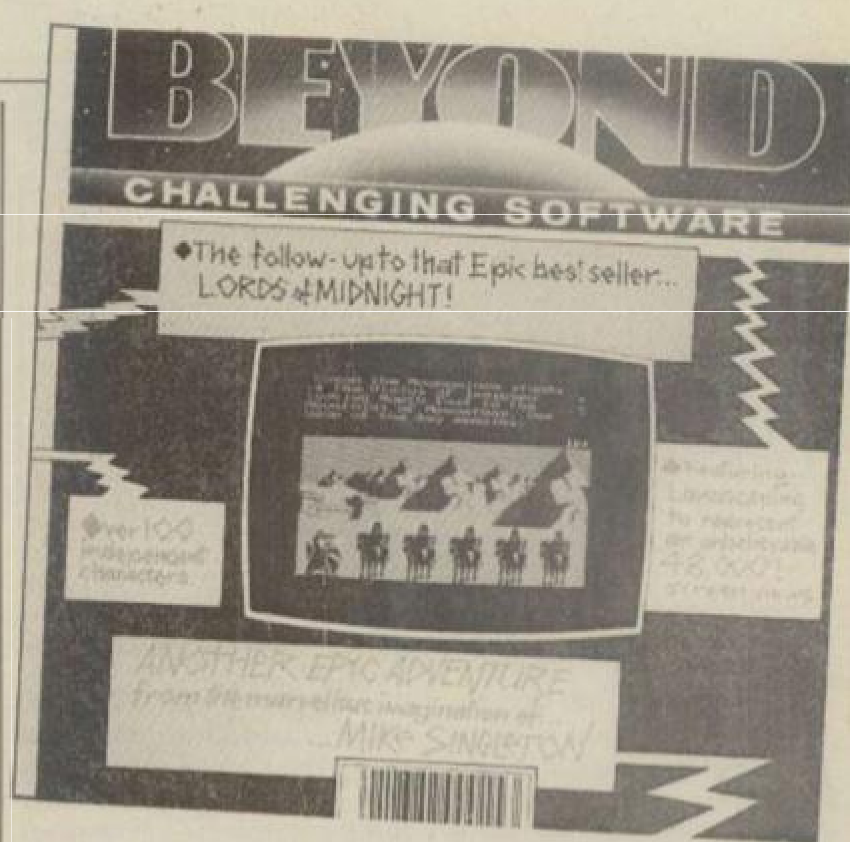
Then in 1983, Terry Pratt, who was founding a new software house called Beyond, visited him to discuss possible games. The result was Lords of Midnight. "Like all my games, it grew out of a technique," says Singleton. "I wanted to do different views of the same location. It wasn't easy on a 48K Spectrum."

Beyond convention

Lords of Midnight finished with 32,000 screens, the sum of 4,000 locations each having eight different views. Singleton had found playing *The Hobbit* frustrating because of the time needed to draw pictures which he felt added little to the game. So he eliminated text input and concentrated on the graphics.

"Instead of reading that the enemy army is on the horizon, you see it – unless there's a mountain in the way," he explains. He also put the player in control of 30 characters, all by simple key-presses. "Lords is not a conventional adventure," he says. "It has a great deal of strategy in it, because that it the kind of game I like to play."

Released in April, 1984, the original game was followed by Commodore 64 and Amstrad versions, and has also been marketed in the U.S. by Minescape. Meanwhile, there was the sequel, *Doomdark's Revenge*, with a total of 6,000 locations and four times as many characters as previously. A third sequel, *Eye of the Moon*, promised for June, will break previous records with 16,000 locations. "I can't tell you how it will be done," says



Singleton. "If you want a clue, it will all fit into 256 bytes."

Singleton is specially pleased with his latest release, written during most of last year together with his former Starlord assistant Warren Foulkes. *Quake Minus One*, he says, is an arcade strategy game in which the techniques of movement used in Lords of Midnight have been speeded to produce



what he calls "action-scaping." "Quite dramatic," he says. "I think it is the best I've done so far."

Writing three major games in only 18 months has meant working an average of 12 hours a day, six days a week. Singleton would like to reduce his working week to five eight-hour days but otherwise is delighted. "I'm not a millionaire but it is pleasant not to have to think about what I spend," he says. Recently he bought a house in the Liverpool suburb of Wallasey and plans eventually to spend more time eating out, seeing films and skiing.

His great advantage, he says, is to have been able to produce complete games by himself – graphics, sound, and even the booklet. "I am fortunate enough to have some artistic ability and, having been an English teacher, I am able to spell correctly, thank goodness," he says. "As for sound, it is just a matter of messing around until it is right."

While determined to remain a freelance, he now feels that the time has arrived "to get help with the nuts and bolts." "It is still possible to work alone for eight-bit machines," he says, "but the 16-bit ones like the Atari will change all that."

After June, when he plans to have finished Eye of the Moon, his next project may well be a game for the Atari 520ST. The Spectrum and the Commodore will keep everyone happy for another year or two, he thinks, but the Atari ST is the games machine of the future. "We're heading for more sophisticated graphics, like movies rather than computer games. It is all a question of how you control them; that is where the innovation will be."

There seems no reason to doubt his promise that whatever he writes next will be "something completely different."

COMPUTER THERAPY



Toni Fine, an occupational therapist at Whittington Hospital, Highgate, north London, is quick to point out that she is only one of many in her profession using a computer to help patients in her care. "It is my particular passion," she says.

Raised in California, she was a high school teacher until she re-trained in Britain as an occupational therapist and qualified two years ago. At about the same time, her two sons, now aged 11 and 15, became interested in computers and acquired a BBC. It did not take her long to realise how useful the machine could be to her.

The same idea, meanwhile, had also occured to the Department of Health and Social Security, which in 1983 installed BBC micros in 40 occupational therapy departments all over the country as a pilot scheme. "Many more of us have been trying ideas on our own," says Fine. "I have been particularly lucky because my job involves specific responsibility for the computer, which means I spend far more time with it than many of my colleagues are able to do."

In the year since she joined the Whittington, Fine has found a variety of simple but ingenious ways in which the computer can be used either to assess patients or to speed rehabilitation.

A simple game, for example, involving moving a tank to catch falling parachutes, is used to check stroke patients both for literacy and for blind spots in their field of vision. Putting a micro on a trolley with a long lead permits a group of geriatric patients to take turns playing children's programs designed to improve their alertness and what is known as "reality orientation".

"They were wary at first," she says, "but now they love it. It is good to see them all wake up and start talking to each other." Members of the same group have also learned how to dial 999 for help – an essential skill for those who are sent home – from a child's teaching telephone which plugs into the analogue port of the BBC.

In the last two months, a woman with head injuries which left her unable to concentrate managed to master a shape-matching program using a concept keyboard – "a great achievement," says Fine.

BBC is ideal

Single-switch programs have proved useful for all kinds of problems. One young man with multiple sclerosis can enjoy a game in which a snake stops and changes direction at the press of only one key. Another with an elbow in traction is encouraged to exercise his hand by squeezing a switch device to operate a simple word processor, in which a cursor moves over a grid to pick out the letters.

Fine has adapted the same principle for a leg amputee who plays a complicated sequencing game by working a switch fixed to a table top with his thigh, thus building up his strength and balance. "The idea is to get him so involved that he does not realise the effort he is making," she says. She has also strapped a mercury switch, which activates a colouring program whenever it is tilted, to another patient's badly-injured arm to help him regain movement.

Another favourite device is a Slomo, made by Mid Valley Micro Products, which plugs into the BBC Tube and slows popular games like *Chuckie Egg*. "It allows even the most unco-ordinated of patients to think they are doing well," says Fine. "It's cheating, but who cares?"

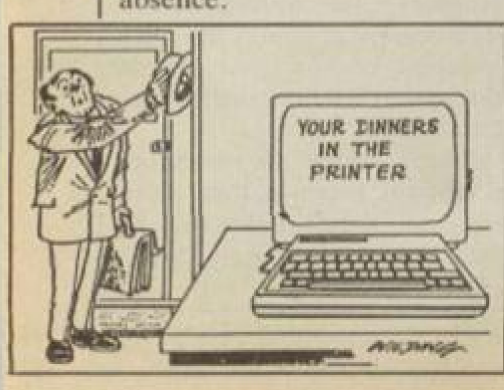
Explaining the philosophy behind her work, she says: "The idea is to motivate people by making access more difficult, not easier. We are telling them the program will work only if you stretch that toe, flex that muscle, reach, use your mind, or whatever. The games also provide them with feedback on their progress."

Fine thinks the BBC is an ideal computer for her purposes, with its several ports and its easy-to-use keyboard. "Besides, with two years work behind us, we could not possibly switch to another machine," she says. A second machine, however, would be most acceptable.

Meanwhile, she has a more urgent problem. "Where can I get an adjustable stand so that patients can always have the screen at eye-level?" she asks.

CONTROLLER

Thanks to a new device just launched by Micro Robotics in Cambridge, next time you go away you could telephone your home to switch the heating on in time for your return or arrange for the plants to be automatically watered in your absence.



The device is called, prosaically but accurately, the Controller and takes the form of a red metal box no bigger than a quarter of the page you are reading now. It plugs into the serial port of any computer – a choice of leads is supplied with it – and can be connected to all manner of sensors, relays and motors. A special language akin to Basic and Logo is used to program the Controller via the computer's keyboard to perform whatever task is required. The device can run more than one program at a time, and can run from batteries if it needs to move around.

At £200, it is considerably cheaper, its makers say, than any similar device currently available on the market. "Although there are plenty of dedicated controllers, mostly performing specific tasks in industry, no-one has yet made a controller small enough and cheap enough to be used in an open-ended range of applications" says distributor Tim Coote. According to Peter Miller, director of Micro-Robotics, the Controller could equally well be used to sort items on a conveyor belt according to colour, check samples, monitor temperatures in a laboratory, run a small lift, operate a light switch with a servo motor connected to it or control a robot arm.

The main areas of interest for the Controller, he says, will be for small industrial applications and in education – both sectors have already put in orders for batches of the product. At the moment, £200 seems beyond the reach of your average Spectrum owner, so home applications may be slower to take off. Nevertheless, several home uses are perfectly feasible, including running heating and air conditioning systems.

The Micro-Robotics Controller is available from Commotion Ltd, 241 Green Street, Enfield, Middlesex EN3 7SJ.



KNIT ONE, PURL ONE

Two years ago, Carol Brooksbank's husband bought a Spectrum because he was taking a librarianship course and needed to learn about computers. He never had a look-in. From the moment she first laid fingers on the keyboard, Carol started finding new uses for the machine, using it to such an extent that her husband has now had to buy a second.

Knitting has always been her favourite pastime, so her first project was to devise a program which would allow her to convert her designs into patterns she could use with her knitting machine. "If you draw a motif on to graph paper," she explains, "and use that as a basis for a pattern, the design will look squashed flat when it is knitted because knitting stitches are wider than they are tall. Since you usually work from the back of a piece of knitting, the result will also be a mirror image of the design you drew originally."

Carol's computer method solves both problems. The first step is to draw the motif she wants on to the screen, using Spectrum block graphics. The design might be made up entirely or copied from, say, a cross-stitch embroidery book or a photograph.

"I often use a commercial graphics program called *The Artist* from Softek at this stage," she says. "It has a number of different-sized brush strokes and a fill-in facility which makes drawing the design very quick and easy."

When the design is finished, she saves it to tape and then loads her own short program, written in machine code, which she taught herself from a book by Toni Baker. The program copies the design into memory, elongates it to one-and-a-half times its original height, turns it back to front, copies it back to the screen, and then superimposes a grid to show where the stitches should fall.

A screen dump on to her Epson printer serves as Carol's final knitting chart; since her knitting machine can handle only two colours, a black and white printout is all that is needed. The chart could also be followed for hand knitting, or used to prepare punch cards for automated machines.

"Knitting magazines are full of advertisements from people offering to do for a fee what my program does in seconds," says Carol. Nevertheless, she has no intention of marketing her program. "I suppose I could," she says, "but I wrote it only for my own satisfaction. Besides, I am too busy doing other things."

Having recently enrolled for a theology course, Carol makes heavy use of her Spectrum, together with Tasword 2 as a word processor. She has also been hard at work listing and putting into alphabetical order, using her own filing program plus wafadrives for storage, her huge collection of records and tapes.

Never a keen games player, except for the occasional bout of computer chess or Scrabble, Carol has now undertaken, just for the challenge, to try to write a Spectrum version of a traditional board game, *Nine Men's Morris*. "The problem is, I don't play the game well enough to work out all the permutations," she says, "but if I ever get it right, I wouldn't mind marketing that."

SIGHT TEST RECORDS

Any clients ordering a pair of spectacles from Brian Gleave's optician's practice in Manchester will, after two years, receive a polite, personalised letter reminding them that it is time for another check.

The reminder is from a computer system which Gleave devised originally with the intention of marketing it among opticians all over the country. The idea never really blossomed but the system has been operating smoothly, not only in Gleave's practice but also one at Wigan.

Gleave's Manchester system runs on a Torch C series business computer with a 10MB hard disc. The one at Wigan is based on a BBC micro with a Torch Z-80 disc pack. Both allow the optician to store personal, clinical and sight test details for 9,000 patients. They also send automatic reminders, at whatever interval the optician chooses, and even follow-up reminders if the first is ignored.

"The reminders are what really make the system worthwhile," says Gleave. "Encouraging people to return for checks can greatly increase the profitability of a practice." Prior to computerisation, he explains, reminders were sent by going through the appointments book of two years earlier and then checking laboriously to see if the patient had returned since the earlier visit. If not, a printed card was sent but a follow-up reminder was out of the question by that method. "The computer system is a great time-saver and the letters also make a better impression," says Gleave.

It was because he needed a more efficient method of sending reminders that Gleave first began to experiment with a BBC micro. Eventually, he enlisted the help of two programming friends who wrote the software he now uses.

They set themselves up as a company called Dan Computer Systems and were to share the proceeds of any systems they sold but it was not to be.

"I suppose opticians are rather stick-in-the-mud," says Gleave. "Only about 20 or 30 in the country have computerised so far."



Labelling system

His practice is part of a large group which includes several chemists, so Gleave decided to try another tack. He and his two programming associates devised a pharmaceutical labelling system based on a BBC with a disc drive. Apart from producing clearly-typed labels, it keeps track of all drugs dispensed, providing the chemist with valuable, constantly-updated business information.

Once again, there was a snag to his plans. New legislation was passed requiring all chemists to change to typed or printed, rather than handwritten, labels by January 1, 1984. Hesitating to launch his product before it was fully up and running, Gleave missed the boat by a month or two, as chemists all over the country rushed to meet the deadline with a variety of other solutions.

"It's a pity because ours was a good, cheap system," says Gleave. He consoles himself with the fact that several chemists in the group are using it and that others may yet succumb top the charms of Dan Computer Systems.

Colossal solution

Dear sir,

I have found a way to transfer Colossal Adventure to disc on an Amstrad CPC 6128.

```
|TAPE
MEMORY &2200-1
LOAD "ADVENTURE",
&2200
|DISC
SAVE "colossal",B,&2200,
30000
```

To load it back type the following:

```
|DISC
MEMORY &3000-1
LOAD "colossal",&3000
|TAPE
CALL &3000
```

When you want to save the date after a day of playing you still need a cassette recorder, but you don't have to wait an hour before the adventure has loaded.

Yours sincerely,
Martyn van der Valk

Telesoft tip

The following alterations to your TELSOFT downloading program may be of interest to readers having a Spectrum and Maplin interface/modem.

The changes are necessary because the original program is designed to work only on interfaces using the 8251 USART chip, whereas the Maplin interface uses the MC6850 ACIA chip.

Only 10 lines of code need to be changed (these are mainly concerned with altering the location of the interface from I/O ports to ROM addresses) and have been set out as complete lines of Hex code in order that the original Hex loader may be used.

If using the original Hex-loader, change the GOTO 50 in lines 230, 250 & 270 to GOTO 30 so that single lines can be entered.

```
Changes to SPECTRUM/TELSOFT code
to suit MAPLIN interface/Modem.

60424 :3E0332FC3C3E1232,235
60432 :FC3C3AFF3C000000,2BD
60440 :0000003E0F328F5C,182

60752 :C365ED3A81EFFE00,50D

60784 :D3FFCD50EDF1C93A,640
60792 :FD3CCB4737C83AFF,4FB
60800 :3CA7C90000000000,22C
60808 :0000000000000000,088
60816 :0000000000000000,090
60824 :0000000000000000,098
```

Problem halved

I am writing to you about the double line feed problem encountered when using an AMSTRAD CPC 464 with an EPSON printer. Previous solutions have included:

1. Cutting Wire 14 On The Printer Connector
2. Setting The Printer's Internal DIP Switches
3. Sticking Tape Over Pin 14 On The Edge Connector.

I have discovered another solution which avoids the problems incured by using the above methods.

My solution is to alter the size of the printer's line feeds using the control characters ESC A and ESC 3.

The ESC A code is sent using

```
PRINT #8,CHR$(27);"A";
CHR$(n)
```

Where 'n' is the size of the line feed in units of 1/72 inch and can be in the range 0 to 85. I find values of about 6 best, but you can use any value you prefer.

The ESC 3 code is sent using

```
PRINT #8,CHR$(27);"3";
CHR$(n)
```

Where 'n' is, as above, the size of the line feed but in units of 1/216 inch and so can be used for more accurate positioning.

I enclose some sample printouts using this method produced using an EPSON RS-80.

I find this a flexible solution which I hope will be of use to your readers.

Alun Thomas.

```
The Following Is Printed With n= 4

 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri
 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri

The Following Is Printed With n= 5

 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri
 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri

The Following Is Printed With n= 6

 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri
 Men Were Real Men, Women Were Real Women, And Small Furry Creatures From Alpha-
Centauri Were Real Small Furry Creatures From Alpha-Centauri
```

Execution time

This program, from Flip Roola of Ruritania is designed to cut the execution time of your program radically. All you have to do is load the basic program given, removing line 50. This pokes the program into the printer buffer. The load your own Basic program or machine code routine. When you are ready to supercharge your program, simply add line 50 to your program somewhere and run it, you will be surprised and amazed at how quickly the program finishes its execution. If anyone has any ideas on enhancing this program, we will be happy to forward any suggestions.

```
 10  RESTORE 72
 20  FOR N=23296 TO 23365
 30  READ A: POKE N,A
 40  NEXT N
 50  PRINT #2:RANDOMIZE USR
     23296
100  DATA 243,14,21,33,34,91,
110  DATA 6,32,126,35,215,13,
120  DATA 16,250,32,243,62,2,
130  DATA 205,51,86,205,53,52,
140  DATA 58,122,92,205,132,53,
150  DATA 195,0,91,0,79,72,
160  DATA 32,78,79,33,32,32,
170  DATA 65,78,79,84,72,69,
180  DATA 82,32,65,80,82,73,
190  DATA 76,32,70,79,79,76,
200  DATA 33,33,33,33,33,33,
210  DATA 33,0,0,0,0,0,
```

**Write to: Your Letters,
Your Computer,
79-80 Petty France,
London, SW1H 9ED.
Tel: 01-222 9090
Our Prestel mail box
number is 01-9991 800.**

Readers should note that because of the disruption caused by the recent move from Kings Cross to Victoria, a backlog of readers' letters has built up. We are answering letters as soon as possible but a reply may take up to four weeks to reach you.

Come in Enterprise

Now and then I've seen advertisements in *Your Computer* about the Enterprise Computer. Do you happen to know the whereabouts of the producer?

I would like to know more about this machine as I have need for a computer with a large memory.

The advertised 3.9Mbytes looks good but isn't. Is there a hitch in it somewhere? Does this memory expansion exist in the real world? How about computing speed?
Stig Hansson.

Editor's reply – Enterprise Computers can be contacted on 01-739 4282. The 3.9MBytes represents the theoretical capacity of the system. This is because RAM is paged in a very flexible way in the Enterprise. However, the Enterprise is not the fastest computer in the world. If you contact Enterprise, they may be able to put you in touch with a company which makes the memory expansions. If you are looking for large memory and speed, you may have to look elsewhere.

Atari have now released a 1MByte version of the ST which should be fast enough for you, and there are plans for a 20MByte hard disk which should be available by the summer.

Dear Uncle Clive,



How your company has changed. From manufacturing the whims of Cambridge techno freaks to producing what the customer wants in only six months is an amazing turnaround. At the launch of the 128 it was not just a revamped product which was on show. The metamorphosised Sinclair Research was the real launch.

By working with software houses on the launch, everyone benefits. By leaving off a joystick port the peripheral manufacturers can stay in business. In other words, you are now working with the rest of the industry instead of merely tolerating its existence. The machine is not only of improved specification – it is also better-engineered.

It is, however, capable of two criticisms. The manual does not do it justice and why not 256K of RAM? The 128 needs 16 memory chips; a 256 would only need eight more expensive chips instead. The 256 would have a smaller PSU, a simpler printed circuit board, and be cheaper to put together. When Alan Sugar was finalising the PCW8256 he was in a similar position to you, yet obviously reached a different decision. With 256K of RAM for £180 a few eyebrows would have been raised.

On the matter of pricing, it is safer to launch too expensive than too cheaply. That is because it is easy to reduce a price, impossible to increase it. You have taken the safe option at £180. Past performance indicates that you will sell the new product at its premier price until you have sold out of the superceded model. Then you reduce the price of the new to that of the old. That is what you did when you launched the Plus and it would make sense with the 128.

So where do you go from here? First, more of the same. Your management team, while improved beyond belief, still seems far from perfect. Management skills are the only true scarce resource in a company and should be nurtured above everything else. Having staff doing jobs beyond their capabilities is counter-productive and weakens the whole team. The second point is not to let the organisation become so powerful that it stifles the vital spark of creativity. This flash of innovation is what you are rightly famous for and without it Sinclair Research would not be Sinclair Research.

Having changed your company sufficiently to survive and to regain credibility, you must now face the greatest challenge of them all, the Japanese. While they can manufacture high-quality products very cheaply, it is not their great advantage. The single factor which puts them ahead of everyone else is their global marketing. They can launch a product simultaneously throughout the world if they want – you cannot. You are left with only two options. You could sell to someone with enough money to make your company a multi-national or one that already is. The trouble with that option is that the company would not be yours anymore. The second option avoids that problem – licence other people to make your products throughout the world. Make sure you or your licensees have a powerful presence in every country, not just a few convenient ones. Start with Microdigital in Brazil.

Bruce Everiss

IN TOUCH

How to write for Your Computer

We called this magazine *Your Computer* precisely because we welcome you views, tips and hints and even your criticisms of machines and software in general.

Here's how you go about getting you name into print. Your article should be typed, double-spaced, on A4 paper. A name and address on each sheet would help. Don't forget to tell us which machine it's for on the envelope. Don't forget full instructions to us how to load and list your program and how to enter it for the readers.

The article must be submitted exclusively to *Your Computer*. We pay £35 per published page — Please put what machine it runs on. With programs please include a cassette or disc and some indication of how long it is.

Computers in Education – A Downbeat View

I read *Your Computer*, March 1986, with great interest, particularly Lee Paddon on the Sinclair 128K Spectrum, and "Classroom Computing".

The boast that Britain is the most computer literate country on Earth is far from true, as recent surveys show. There never was any educational philosophy behind the slogan "A micro in every School", the government was touting an economic panacea rather than an educational solution. The main beneficiaries were to be three small computer firms who never got their act together and are now in a state of collapse. The educational benefits have been vague and patchy, with most applications unimaginative and boring. Britain only ever led the world in underpowered micro computers.

Despite boasts about the very high numbers of home computers in the UK, most parents have never used their computer. Home computers are almost solely used for game playing and are seldom used for programming, which most children find boring. Illegal copying is the most favoured way of obtaining programs, a practice that caused a slump in the market while the number of people using their machine for games actually increased.

Parents have been led to believe that just sitting in front of a computer was going to guarantee that their children were going to get a job. Advertising pushed computers in the same way that encyclopaedias have been pushed. Parents were made to feel that their child was under privileged if they did not buy a computer, and believed that as long as their children were seen to operate the machine then their children had competence with the computer.

Employers are not impressed by children who leave school having used a computer. They prefer schools to concentrate on teaching children to read write and figure. Actual literacy and numeracy are valued more than trendy notions of computer literacy. Universities actively discourage advanced level computer studies on the basis that it takes them the whole of the first year to un-teach the rubbish that has been imparted by the schools. Employers and Universities prefer evidence of competence in foundation topics which will justify training in computing as appropriate.

Computers could, with proper software and adequate teacher training, radically improve education but the current position is that we are fostering shoddy software and underpowered micro computers on untrained and confused teachers and bored pupils.

The only way to realise the long term benefits of the computer revolution is to be fierce in countering, ludicrous, trendy and unsupported claims and in opposing pointless or low quality applications of the micro-computer wherever we meet them.

(Me? I started using computers as a Chartered Engineer in 1964 and recently have taught computing as Head of Department in a Comprehensive School.)
D. W. G. Thornley, Bishop Auckland.

Tale of Doom

A few months ago I bought the game "Pyramids of Doom". I thought that it would be fun to try the adventure games by Scott Adams because I had heard a lot about them from friends. Unfortunately since then I have only managed to walk around the first four rooms. I have already found a tiny key but apart from that I have been unsuccessful. Could you please give me some directions or advice?

The shop from where I bought it from doesn't sell computer games any longer and no one has ever heard of it before at my computer club. I already tried to ask at Adventure itself but I couldn't be helped. You are my last resort.

So please, please, please can you please give me some directions or the name of a place that can.
L. Pannett, London.

Editor's reply – There is only one hope left for you, David Williams on our adventure helpline, phone 041 770 9599.

Broken Promises

The promises which Commodore made for the C128 seems to have gone astray.

Most of the software advertised have got a 64/128 label, which does nothing for the 128 or CP/M mode.

Regarding the CP/M mode nobody seems to know exactly what format you need to run software let alone which software runs on the C128.

Two companies have advertised CP/M programs for the C128, but on asking them for prices and details I have not had a reply, now I see they have taken the offers out of their adverts.

Chris Kaday, Commodore's Marketing Director, commented in the March issue of *Commodore Horizons* on the C128 said "With immediate access to thousands of existing CP/M Business Programs the software base for the C128 is formidable" writing to Mr. Kaday on his remarks I have not had any reply.

Owners of the C128 were asked to purchase the CP/M Plus Users Guide from Commodore for £24.95. This includes disks and a manual but no instructions how to obtain programs to run, so this piece of equipment just stands idle. The two clubs ICPUG and CP/M Users Club (UK) have yet to come up with anything.
Terence A. Motley, Braintree.

Editor's reply – we range the CP/M users group, and they said that Commodore had been equally uncommunicative with them. So they want anyone who could supply them with the "Stat DFK:" and a text file of 16K or more to get in touch. This would allow them to make all their public domain CP/M software available to C128 owners.
Anyone who can help should contact the CP/M membership secretary at 72 Mill Road, Hawley, Dartford, Kent or phone 0322 22669.

Reviewing the Reviewers

I do have one small complaint to make, and that involves reviews of games such as "Code name Matt II" and "Jet Set Willy II". In such reviews the games do not often get good reviews as they are just slightly modified versions of the original. Whilst this is sound advice for those who have JSW I etc, what about those people like myself who have only recnelty discovered the joys of microcomputing? We find that JSW I gets a brilliant review, but JSW II, a bigger game with more rooms, gets a bad review, so which do I buy? Would it be possible to perhaps print two sets of marks, one for owners of the original game, and one for newcomers to micros? Again, as a newcomer to micros I see many references such as "Alien 8 style . . . Sabre Wulf graphics" etc, etc. So, having missed reviews of said games, we are faced with classic games that we know nothing about. Would it not be possible to occasionally reprint reviews of classic games to give newcomers an idea what the fuss is about?
Sean Kelly, Leeds.

Editor's reply – In its time, Jet Set Willy was a revelation and

received rave reviews and huge sales. However, the software market does not remain static, and what was a revolutionary game in its day, to a certain degree does not stand comparison with many recent releases.

So while JSW was superb, by the time JSW II made its appearance, despite being larger, and therefore better than JSW, it did not bare comparison so well with its contemporaries. Sorry about the reviewers shorthand for describing games, but if you have to describe what an arcade adventure looks like for the third time in one month, it gets a bit dull for reader and author alike.

Sin of Omission

```
95 REM  MISSING LINES IN JANUARY ISSUE
4305 DATA 88,D0,F3,B1,88,49,80,91,1249
4313 DATA 88,4C,C3,10,48,A0,00,A9,327
4321 DATA BC,91,88,68,C9,0D,F0,1C,1058
4329 DATA C9,11,D0,0A,20,08,11,90,537
5369 DATA 54,52,41,4E,53,44,49,53,616
5377 DATA 4B,20,56,32,2E,30,20,20,401
5385 DATA 20,20,20,20,20,20,47,2E,309
5393 DATA 48,41,54,54,4F,20,27,38,511
5401 DATA 35,00,45,4E,54,45,52,20,467
5409 DATA 4E,45,57,20,53,54,41,52,580
5417 DATA 54,20,41,44,44,52,45,53,551
5425 DATA 53,3A,00,45,4E,54,45,52,523
5433 DATA 20,4D,41,54,43,48,3A,00,455
5441 DATA 53,54,41,52,54,53,20,41,578
5449 DATA 54,0D,2E,2E,2E,2E,2E,2E,373
5457 DATA 2E,2E,2E,0D,45,4E,44,53,449
5465 DATA 20,41,54,20,20,0D,2E,2E,350
5473 DATA 2E,2E,2E,2E,2E,2E,2E,0D,335
5481 DATA 46,49,4C,45,20,54,59,50,573
5489 DATA 45,0D,2E,2E,2E,2E,2E,2E,358
5497 DATA 2E,2E,2E,00,43,55,52,52,454
5505 DATA 45,4E,54,20,46,49,4C,45,551
5513 DATA 20,49,53,3A,00,54,4F,54,493
5521 DATA 41,4C,20,4F,46,00,4C,4F,477
5529 DATA 41,44,20,45,52,52,4F,52,559
5537 DATA 3A,20,2A,2A,2A,20,4F,55,412
5545 DATA 54,20,4F,46,20,4D,45,4D,520
5553 DATA 4F,52,59,20,2A,2A,2A,00,408
5561 DATA 4C,4F,41,44,49,4E,47,20,542
5569 DATA 53,45,4C,45,43,54,45,44,585
5577 DATA 20,46,49,4C,45,2E,2E,2E,458
5585 DATA 2E,00,53,41,56,49,4E,47,502
5593 DATA 20,4E,45,57,20,46,49,4C,517
5601 DATA 45,20,4F,4E,20,44,49,53,514
5609 DATA 4D,2E,2E,2E,2E,00,45,52,410
5617 DATA 41,53,49,4E,47,20,45,58,559
5625 DATA 49,53,54,49,4E,47,20,46,564
5633 DATA 49,4C,45,20,4F,4E,20,44,507
5641 DATA 49,53,4B,00,41,52,45,20,479
5649 DATA 59,4F,55,20,53,55,52,45,604
5657 DATA 3F,20,20,2D,20,54,59,50,457
5665 DATA 45,20,27,59,27,20,4F,52,461
5673 DATA 20,27,4E,27,00,22,20,22,288
5681 DATA 20,4E,4F,54,20,41,4C,4C,522
5689 DATA 4F,57,45,44,20,49,4E,20,518
5697 DATA 46,49,4C,45,4E,41,4D,45,577
5705 DATA 00,00,00,00,00,00,00,00,0
```

Thank you for publishing my program TRANSDISK on pages 96-98 in the January issue of *Your Computer*. It appears however that you have omitted quite a large amount of the DATA statements in the listing. The program will therefore not run as it stands. The offending lines are 4305 to 4369 and lines 5369 to 5705 and are repeated here for inclusion in a later edition of your magazine. Sorry to the readers who typed in the listing shown over the festive period!

Thanks.

Geoff Hatto, Farnham.

School computing in practice

The second of our Computers in Education reports moves out of London and south into Hampshire's New Forst, where we visited Walhampton prep school. Situated just outside Lymington, a mile or so from the coast, the school enjoys, on those few clear days, splendid views of the Solent and the Isle of Wight.

While the school supports almost every feasible sports and recreational activity, the development of computers, and particularly their inclusion in the school curriculum, has been a slow and difficult process.

It all began in 1980, when the school acquired two Commodore Pet computers, one donated and one on loan. Surprisingly enough, while computers initially were associated with pimple-faced youths wearing thick spectacles, the Pet was given by one of the school governors and he visited the school twice a week to teach computing to the 7-to-14-year-old pupils as a hobby.

In those early stages none of the masters had experience of computers and no more than 20 pupils used them in the first year. In 1981, the school bought its first computers, two ZX-81s. The effect was astonishing; those high-powered machines with their massive 1K memory capacity signalled the start of a computer boom.

Straight into action

In the next three years the school acquired a Spectrum, Commodore 64 and six Vic-20s, all of which went straight into action. Their use was restricted to pupils in the third form and above, who frequently arrived armed with tape recorders and cassettes bearing familiar inscriptions such as *Space Invaders* and *Pacman*.

While many schools initially regarded games playing as a time-wasting, uneducational exercise, and kept the computer room locked for much of the time, Walhampton saw it as a method of getting children interested in computers. A computer analyst was employed to visit the school three times a week for hourly teaching sessions but outside those times the older pupils could use the computers at will.

Many showed an immediate talent for programming; one pupil spent a year producing an analysis of the plant life in the school grounds, involving his science master and the rest of the form in collecting data and drawing maps, which he transferred on to a Vic-20.

Teaching the teacher

Computing gave many pupils the opportunity to become experts on a subject about which their teachers knew nothing. In the Easter term of 1983, the school tried to equalise that increasing advantage by giving the teachers a course in computing. It was later decided that, in the light of increasing computer developments, all pupils should be made aware of their use and importance in society. From July, 1984 short courses lasting a week were held for all pupils leaving the school and pupils in the second form were required to take computing as a compulsory subject for a year.

In December, 1984 a new master was employed to teach mathematics and computing, act as housemaster, and use his skills as an engineer to set up a networking computer system.

After extensive research and consultation with the Independant Schools Microelectronics Centre, he decided in the spring of 1985 that the BBC Econonet system was most suitable and that a certain major retailer represented the best value. The latter decision cost the school many months of frustration and led to several rude letters exchanging hands. Eleven BBC model Bs were ordered from the retailer with a complete Econet system, including file servers, interfaces and dual disc drives.

That initiated a battle to get the system delivered. The retail shop blamed Acorn, which naturally blamed the shop. By September, 1985 the system had still not arrived and when it did it was obviously second-hand – manuals, station identity links and an assortment of other pieces were damaged or missing. The retailer allegedly tried to persuade the school that there was no such thing as a 40/80-track switchable disc drive, because it stocked only 80-track drives! "The service was abysmal," noted the bursar.

Eventually the school cancelled its order and tried using Landsowne Computers of Bournemouth. That company was more helpful but there were still difficulties – the cable supplied, which the school intended to install itself, was designed for communications between different parts of the country, not terminals less than a foot apart. Having broken several units trying to connect it, it proved too thick to use at all.

Eventually, by February, 1986, the system was complete, a year after it was first ordered, and most of the work having been done by the school. The school is finally ready to open what was a scripture room and is now a modern-looking computer room, with beautifully-contrasting old oak beams above the 12 new terminals.

Own grown software

Walhampton's problems are not yet over – now that they are ready to include computing in the school curriculum – and it has been a squeeze getting an extra subject on to the timetable; suitable software is proving to be as difficult to obtain as the equipment to use it.

Without the support of a regional educational authority such as the Inner London Education Authority which contracts publishers to write suitable software for its schools, Walhampton either must try to write its own software or risk purchasing educational software which is unsuitable.

For the school to write its own software is impracticable until computers are well-established – and retailers do not allow schools to view software

The school opens the computer room for the first time after the half-term break and those in the third form will have one compulsory lesson per week. The software used eventually will probably be of a mathematical and English nature, although pupils will be encouraged to develop their own programs.

After all the traumas the school is introducing the system in tentative steps. We shall return in a few months to report on the new part computers play in the daily routine of the children and how they have adapted to the system. Until then we wish the school every success in its newest and most advanced subject.

Embarking on a career, even one as new and exciting as computing, is a serious business which requires a good deal of thought, careful consideration and planning. To help with that planning and make clear the detailed options available in the information technology job market, *Your Computer* has instituted a regular Careers feature.

In this, the second in the series, we look at the training courses you need to qualify for various jobs in the industry and how you follow and pass those courses. The key is deciding how and why you want to take a given course of study.

We looked at programmes at the Polytechnic of North London as an example of an institution with a strong tradition in computer studies and investigated how such courses are conducted there. At PNL, there are a variety of ways to obtain computer qualifications in its computing department.

You will not, however, have to worry about taking your own hardware. NLP has a DEC-10 minicomputer which allows up to 80 simultaneous users and a VAX 11/780 which fits another 48 interactive terminals. The institution also has four sophisticated graphics workstations

Robots centre stage in education

The second High Technology and Computers Exhibition at London's Barbican was restricted to educationalists, with tickets distributed to all educational establishments at home and overseas, directly or through Embassies and High Commissions. That kept the crowds to a minimum – under-18s were not admitted – making for an atmosphere in which educationalists could talk to dealers without making themselves hoarse.

This year the emphasis on computers and software had shifted to accommodate new developments in other fields, such as robotics, publishing, laboratory equipment and education for the disabled. To supplement that a number of seminars were held in remote parts of the centre which proved to be extremely popular.

As usual, the BBC Micro seemed to be the focal point of the show; many software and hardware manufacturers said that between 75 and 95 percent of their sales were BBC-orientated. At the Acorn stand, the centre of attraction was the new BBC 128 with its biggest rival next door, the new Research Machines Nimbus.

Both those machines reflect the increased power and flexibility which schools now require and are prepared to pay for despite their price. Research Machines commented that while the Nimbus was designed primarily as a door into the business computer market, of the 10,000 already sold approximately 7,000 have gone to educational establishments, so reducing the price to less than that of the RML 480-Z. Meanwhile, the BBC Master series is popular with schools already based around the BBC, particularly those with Econet.

Robots and Logo

Robotics is playing an increasing role in education at all levels, with robots such as the Zero Z having great potential for expansion. At primary school level robots are used with Logo while at higher levels, universities and colleges can use the same robot for obstacle detection, speech, watering the plants and even taking photographs. Even the Lego stand was crowded with fascinated adults playing with robots which now incorporate conveyor belts, optical sensors and miniature Lego graphics plotters.

One of the most interesting developments on display was a new keyboard which comes from the Netherlands, where it has been marketed for the last three years. The Velotype will replace any stand-alone Qwerty keyboard, and is designed to increase typing speed to a maximum.

Using only 37 ergonomically-positioned keys, words are entered in syllables – several keys are pressed at once – and their order is arranged by the internal processor. In a recent test a top Dutch secretary typed 240 characters per minute on a Qwerty keyboard. In the same time a Velotypist produced 740. That is faster than most people can speak, so shorthand becomes obsolete.

As usual, there was an abundance of small software companies with programs for use in primary and secondary schools. Many of them are developing software for machines other than the BBC, Commodore 64 and Spectrum, namely the increasingly popular Atari ST, Amstrad and the Commodore Amiga.

Diverse industry

The show demonstrated clearly the diversified industry which has built up round computers in the educational market. There were more than 150 exhibitors, some catering for highly-specialised departments such as pneumatics, while others presented electronic equipment and furniture to accommodate computers in all stages of education. Even the London Rock Shop has something to offer – its midi interface for the BBC is used by Ultravox, Vince Clark, Blancmange, and Tears For Fears, as well as the highly-successful Norwegian band A-Ha, which was No. 1 in the charts when the show took place.

On course to a byte future

and a range of 8- and 16-bit micros.

You can study computing in combination with a selection of other subjects or as part of either a combined science degree or a more specialised degree or diploma. The degrees usually take between one and three years of full-time study, or up to four years of sandwich or part-time study. The various routes to computing diplomas at PNL comprise:

BSc/BSc Honours Combined Science. This path offers computing as a major subject in combination with mathematics, physics or statistics. It is also flexible as it provides for studies in programming business systems, statistical techniques, real-time systems and data communications networks.

BSc/BSc Honours Mathematics and Computing. If you want a job as soon as you graduate, this is probably the course most likely to interest you. It is a programme of study orientated to practical applications of mathematics and computing to industry, commerce and scientific research. The close relationship between mathematics and computing is highlighted by supplementary courses in numerical analysis, graphics, discrete mathematics and signal processing. The three-way course lays your basic groundwork in the first two years and finishes by providing a good spread of practical applications for your knowledge. To enter the course, you will have to have passed mathematics as one of your A level subjects.

BSc/BSc Honours Statistics and Computing. If you want either pure computing courses or plan a career in statistics, this three-year course is the route to consider. You are given a thorough training in applied statistics and operational research and how to use computers to solve problems in those fields. The course also covers programming design, computer systems and microprocessors and practical applications of them. Again, you will need A level mathematics.

BTEC HND Mathematics, Statistics and Computing. A two-year training course which balances theoretical and practical work in the three major concentrations to offer a sound education with which to enter the job market. In addition to the classes you must take in the main subjects, you would work in a team project in the final semester and choose from interest options which include industrial statistics, relational databases and associated mathematics. For the course you need a A level in mathematics or a Polymaths certificate, or a BTEC national diploma with a pass with merit in level three mathematics or two other level three units.

There are, of course, postgraduate courses and on-the-job training programmes run by companies at which you can look but, all-in-all, the PNL courses give you a good idea of the kind of courses available through polytechnics and the qualifications you need to enter them.

In the next issue, we continue our profiles of jobs and look at some of the positions you might consider seeking after the qualifying courses we have listed.

Avon, Devon, Dorset, Somerset

Brunel Computer Club
Mr. R. Samson
4 The Coots,
Stockwood,
Avon

Brunel Tech Computing Club
S. W. Rabone
18 Castle Road,
Worle,
Weston-Super-Mare,
Avon
BS22 6JW

Byte Home Computer Club
Valerie Boyde-Shaw
7 River Way,
Nailsea,
Avon
BS19 1HZ

Parkway Computer Group
John S. Elver
198 North Road,
Stoke Gilford,
Bristol,
Avon
BS12 6PH

Tangerine Hombrew
A. Ryan
45 Winchester Road,
Brislington,
Avon
BS4 3NQ

Berkley Nuclear Labs
Neil Walker
53 Woolfridge Ride,
Alveston,
Bristol
BS12 2PR

Brixham Dragon Owners Club
Ian Chipperfield
22 Brookdale Court,
Brixham,
Devon

Exeter And Dist Acc
Simon Williams
Sheepwash,
Beeworthy,
Devon

Plymouth And Dist Acc
Stuart Bell
31 Victoria Place,
Plymouth,
Devon
PL2 1BY

Torbay Users Club
J. D. Parket
41 Gibson Road,
Whiterock,
Paignton,
Devon
7Q4 7AQ

Totnes/S Devon Computer Club
Frank Watson/Andrew Page
Dart Inst Community Studies,
Dart,
Totnes,
Devon,
TQ9 6JE

Bournemouth Area Computer Club
Peter Hibbs
54 Runnymeade Avenue,
Bournemouth,
Dorset
BH11 9SE

Bournemouth BBC U.G.
Norman Carey
26 Felton Road,
Parkstone,
Poole,
Dorset

East Dorset Computer Club
P. Yendle
Poole Collete of FE,
North Road,
Poole,
Dorset

ICPUG (Bournemouth)
Douglas M. Shave
97 Canford Cliffs Road,
Poole,
Dorset
BH13 7EP

Purbeck Computer Users Blub
31 North Street,
Wareham,
Dorset
BH20 1HD



Topic
David Washford
1 Alexandra Road,
Bournemouth,
Dorset
BH6 5JA

Forth Users Group
David Husband
2 Gorleston Road,
Branksome,
Poole,
Dorset
BH12 1NW

Yeovil Computer Club
D. G. Carrington
2 Romsey Road,
Yeovil,
Somerset
BA21 5XN

Millfield Computer Group at Enfield, Middlesex attracts its members from a wide area. Sinclair owners predominate.

Don't talk to Alan Gregory about the downturn in the home computer market. The head of Millfield Computer Group has seen it all in the three years since his club was founded in February, 1983 and he is still convinced that there is life in the old market yet.

Although his membership has dwindled from an all-time high of 160 to a mere handful meeting twice a month, the group still attends all ZX Microfairs – and anyone who has been to one will know how popular they still are – has an active affiliation to the Association of London Computer Clubs and maintains a packed programme which features lectures and open meetings. The programme for February and March, for example, included lectures about educational software and the use of Sinclair Microdrives, as well as a raffle and demonstrations of business software.

Despite its broad appeal, the group tends to attract a large number of Sinclair owners, with a few BBC users thrown in for good measure. The majority of members own either Spectrums or QLs and travel from as far as Reading to attend group meetings.

Gregory recalls how the group started with the aim of educating the public about how to use home computers and gradually grew into an enthusiasts' club. "Initially, members wanted to use the computers and learn more about how to use them properly," he says. "Now there are far fewer members, mainly because computers can be bought anywhere and programming is not such a necessary part of why people use their machines."

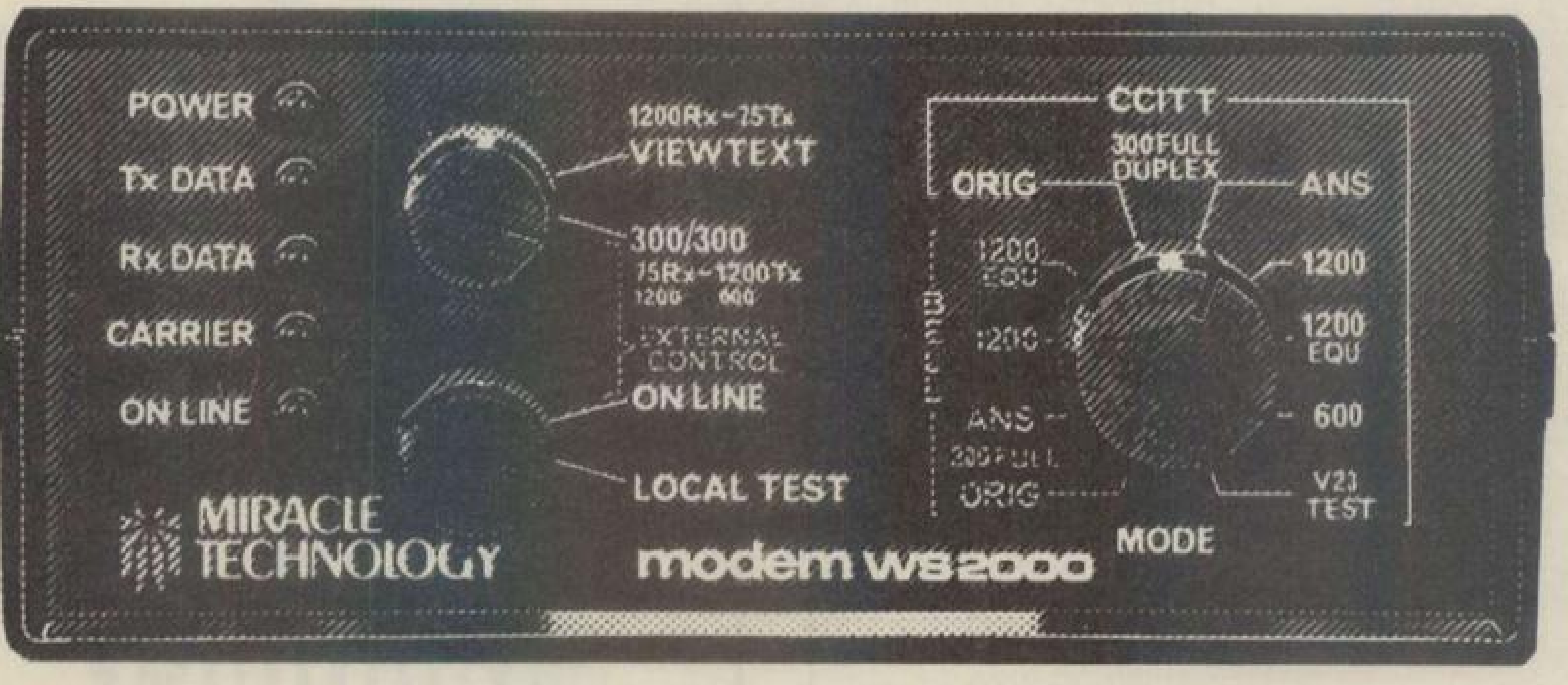
Broad appeal

Despite his keenness, Gregory and his group do not have to soldier on entirely without help. They get support from the ACC, ALCC and the Arts Council of Enfield and meet at the Millfield House Arts Centre, which has its own licensed bar and parking area. The latter is particularly important, as members have to take their own equipment to the meetings and often need cars to do so; it is difficult to fit a QL, monitor, interface, disc drive and printer into a carrier bag to take on the train.

The group now meets more often than it did, despite the lower membership. When it started, the MCG would meet only once a month. Now sessions are twice monthly, with one meeting devoted to a specific topic and perhaps a lecture and those others being open sessions where people can take their machines, help one another solve programming problems, and discuss ideas.

MCG is, of course, a member of the ALCC and can be contacted either through that body or by calling Alan Gregory on 01-803 0136 or Tony Gibbs on 01-449 9619.

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ATARI COMPUTERS



Atari 520ST computer with 3.5" disc drive, mouse, monitor and software:- b/w with single sided disc drive £675 (£650) £730, b/w double sided £718 (£692) £771, colour ss £899 (£862) £974, colour ds £942 (£904) £1015. 500K ST disc drive £139 (£138) £158. 1000K 5" disc drive £182 (£179) £199. 10 Megabyte ST hard disc £487 (£435) £475. ST Colour monitor £397 (£366) £416. 130XE computer + cassette recorder + software £158 (£158) £183. 130XE computer + disc drive + software £248 (£249) £279. 130XE computer + disc drive + 1027 printer + software £335 (£333) £393.

SINCLAIR COMPUTERS



New Sinclair 128K version of the Spectrum – please write for prices. Sinclair pocket TV £97 (£95) £101. Sinclair QL Computer £194 (£196) £229. QL Floppy disc interface (See Cumana disc section below for suitable disc drives) £86 (£84) £94. Sinclair Spectrum Plus Computer 48K £123 (£127) £147. Spectrum Plus Computer + cassette + 4 games + joystick with interface £139 (£139) £169. Kit to upgrade the Spectrum to Spectrum Plus £40 (£40) £50. Microdrive £49 (£50) £60. RS232 interface 1 £49 (£50) £60 Special offer:- Microdrive + Interface 1 + 4 cartridges £97 (£99) £107. Blank microdrive cartridges £2·50 (£3) £4. Spectrum floppy disc interface (See Cumana disc section for suitable disc drives) £107 (£99) £109. Interface 2 £20·45 (£20) £24. 32K memory upgrade kit for 16K spectrum (issue 2 and 3 only) £31 (£28) £30. Spectrum Centronics printer interface £46 (£42) £47. Alphacom 32 printer £51 (£48) £62.

COMMODORE COMPUTERS

Commodore 128 £250 (£249) £279. New Commodore 128D £464 (£460) £510. 1570 Disc drive £187 (£186) £206. Commodore 128 + 1570 Disc drive £419 (£409) £459. Commodore 64 + recorder + musicmaker keyboard + software £187 (£213) £243. Commodore 64 + disc drive £278 (£280) £340. Convertor to allow most ordinary mono cassette recorders to be used with the Commodore 128 and the Commodore 64 £9·78 (£9) £11. Centronics printer interface for Vic20 and the Commodore 64 £45 (£41) £46. Commodore 64 Disc drive £191 (£186) £217. MPS803 Printer £138 (£145) £175.

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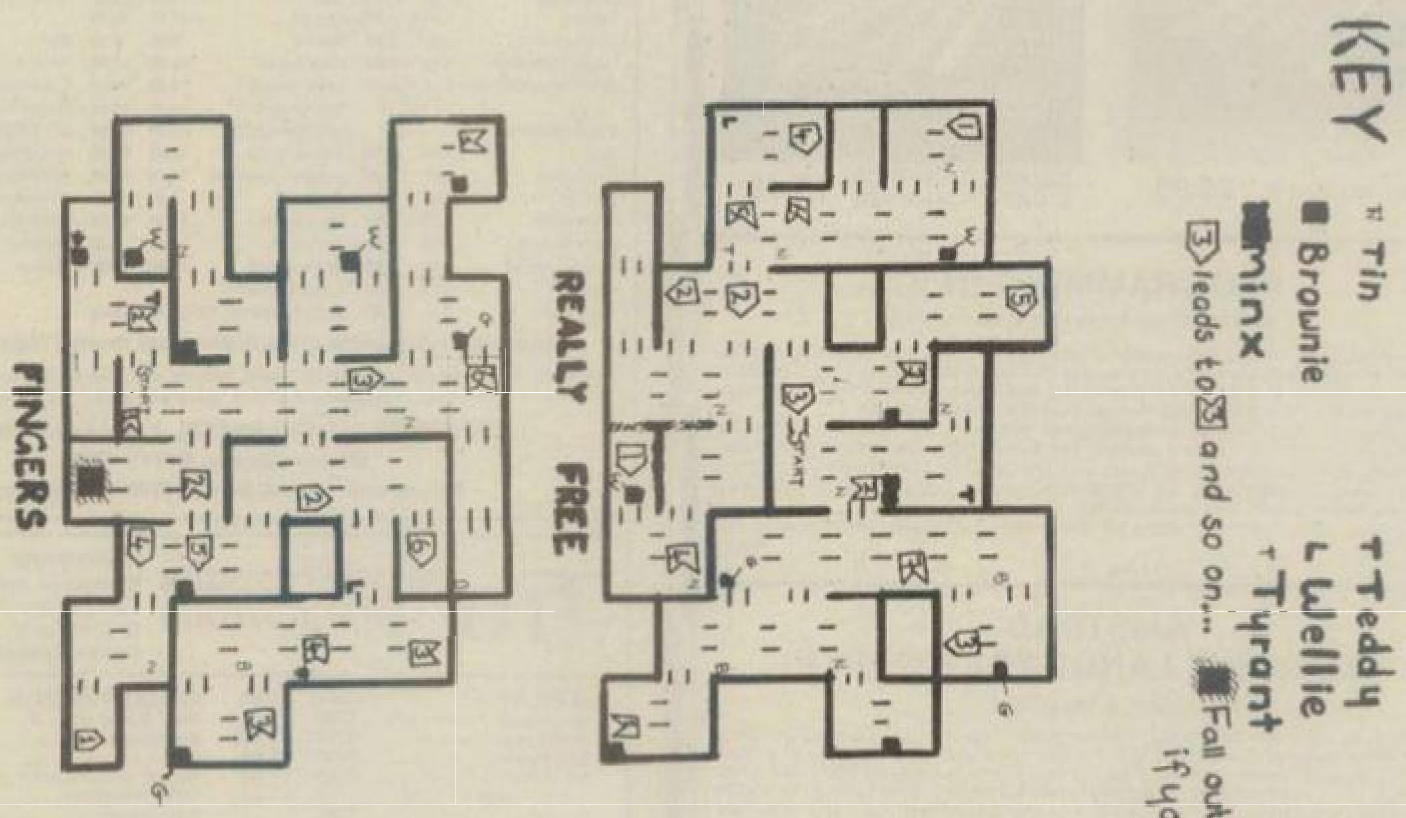
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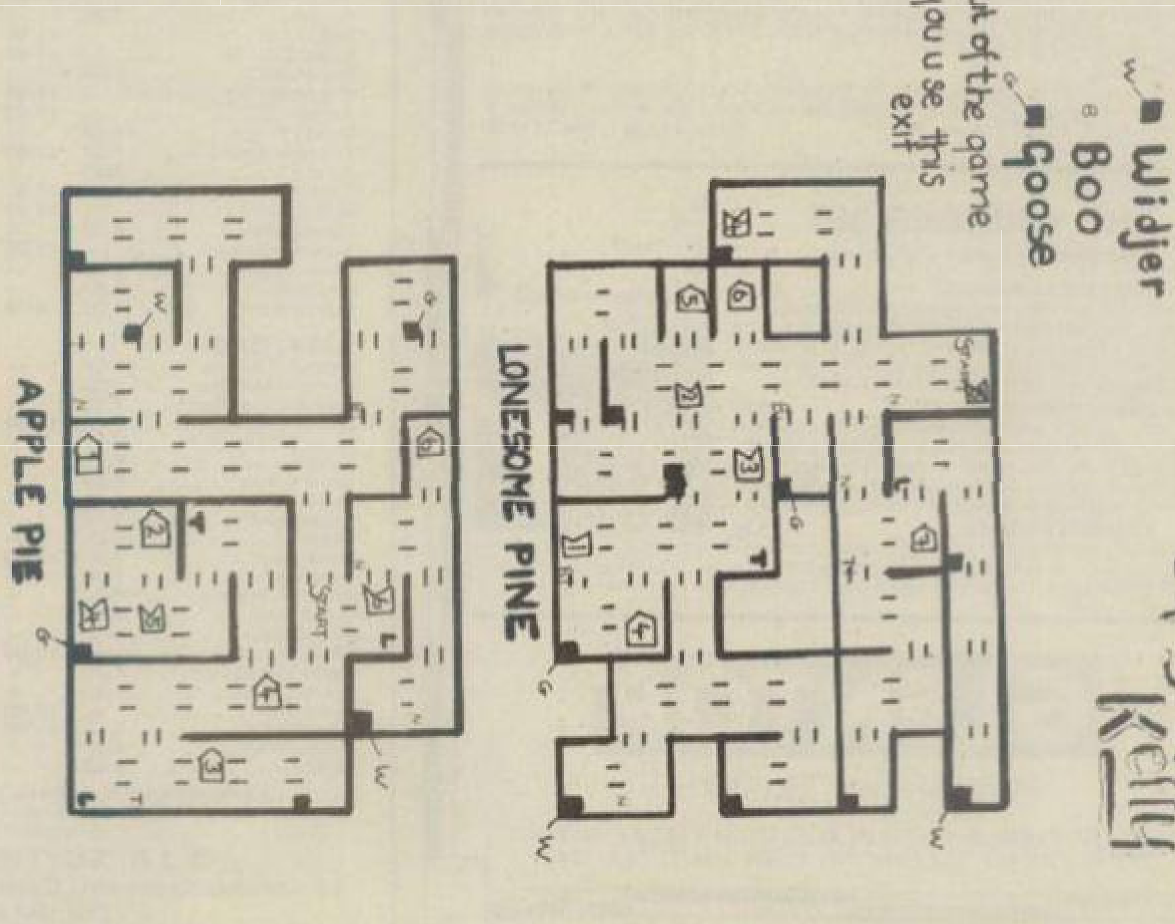
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Sweevo's World Mapped





Our thanks go to Sean Kelly for this map of Gargoyle's chart-topper Sweevo's World. He also offers some advice for completing this wonderfully comic arcade adventure. The tyrant is killed by dropping a wellie on his head, the minx by doing likewise with a teddy bear. The "BOO" in the top right hand corner of "Fingers" does not need any stacking of objects to get.

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CITY DEFENCE

◆ Amstrad ● J. Kennedy ● Co. Down, N. Ireland

It is near the end of time and the missiles have begun to drop. Your only escape is to fire anti-missiles at the enemy's missiles. As you destroy their missiles the bombardment gets thicker. So, the faster you work, the faster they try.

The program is in Basic, so can be easily saved and run. The program is very fast in respect of the basic and is played with joystick or keyboard.

```
10 REM ==--==--==--==--==
20 REM -- CITY DEFENCE --
30 REM ==--==--==--==--==
40 REM --  J  KENNEDY  --
50 REM ==--==--==--==--==
60 REM -- 20 July 1985 --
70 REM ==--==--==--==--==
80 GOSUB 1740
90 DEFINT b-z
100 ENV 1,1,15,1,15,-1,5
110 ENV 2,15,-1,20
120 ENV 3,15,-1,10
130 ENT -1,10,5,1,10,-6,1
140 ENT -2,1,50,1,1,-40,1,1,20,1
150 GOSUB 1100
160 GOSUB 1530
170 DIST=2
180 MODE 0
190 RESTORE
200 DIM x(10),y(10),dx(10),ci(5),ex(8):FOR a=
1 TO 8:READ ex(a):NEXT
210 REM GAME LOOP
220 score=0
230 INK 0,0:INK 1,20:BORDER 0:INK 13,20:INK 1
5,6,15:SPEED INK 4,4
240 angle=3
250 cities=4
260 FOR a=1 TO 4
270 ci(a)=4+(a-1)*4
280 NEXT a
290 num=5
300 delay=50
310 REM SHEET LOOP
320 ammo=20
330 sub=0
340 GOSUB 870
350 cu=10:ca=10
360 FOR a=1 TO 10:x(a)=INT(RND*500)+65:y(a)=3
99+INT(RND*delay):dx(a)=2*(-(1+(INT(angle/2))
)+RND*angle):INK a+2,INT (RND*20)+6:NEXT
370 a$=" "+CHR$(244)+"  ":u$=" "+CHR$(8)+CHR$(
10)+CHR$(246)+CHR$(8)+CHR$(10)+" "
380 LOCATE ca,23:PRINT a$:LOCATE 1,cu:PRINT u
$
390 fu=0:fa=0
400 fc=0
410 REM PLAY LOOP
420 miss=num
430 FOR a=1 TO num:IF y(a)=1000 THEN 530
440 PLOT x(a),y(a),a+2
450 x(a)=x(a)+dx(a):y(a)=y(a)-dist
460 IF (x(a)<34 OR x(a)>605) THEN dx(a)=-dx(a
):IF y(a)<400 THEN SOUND 130,0:SOUND 2,500,0,
15,2,1,0
470 DRAW x(a),y(a)
480 col=TESTR(0,-2)
490 IF col=13 THEN GOSUB 1210
500 REM IF col=1 THEN 660
510 IF col=15 THEN GOSUB 810
520 IF y(a)<51 THEN GOSUB 1360
530 NEXT a
540 IF fc<>0 THEN GOSUB 1450
550 GOSUB 1000
560 IF miss>0 THEN 430
570 IF ammo=0 THEN 660
580 PEN 1
590 FOR q=1 TO 2000:NEXT q
600 LOCATE 5,5:PRINT "SCORE:";score:FOR a=1 T
O ammo STEP 0.25:LOCATE a,25:PRINT " ";:score
=score+5:LOCATE 11,5:PRINT score:SOUND 1,1000
,1:FOR q=1 TO 100:NEXT q:NEXT
610 IF cities<>0 THEN FOR a=1 TO cities:LOCAT
E 4+(a-1)*4,11:PRINT CHR$(128);CHR$(129):scor
e=score+200:LOCATE 11,5:PRINT score:SOUND 1,5
00*a:FOR q=1 TO 900:NEXT:NEXT
620 IF sub<>0 THEN LOCATE 5,7:PRINT "PENALTY:
";sub*100:score=score-sub*100
630 IF sub=0 THEN LOCATE 5,7:PRINT "BONUS:";n
um*50:score=score+num*50
640 LOCATE 5,9:PRINT "TOTAL:";score
650 FOR q=1 TO 3000:NEXT
660 IF cities=0 THEN 720
670 IF delay<>0 THEN delay=delay-5
680 IF INT(RND*2)=1 THEN angle=angle+2:IF ang
le>30 THEN angle=30
690 IF INT(RND*10)=1 THEN num=num+1:IF num>6
THEN num=2
700 IF INT(RND*10)=1 THEN DIST=DIST+1:IF DIST
=9 THEN DIST=8
710 GOTO 310
720 FOR a=15 TO 2 STEP -1:SOUND 128+INT(RND*8
),0,100,16-(a/2),0,0,a:FOR q=1 TO 400:NEXT q:
NEXT
730 SOUND 135,0,0,15,2,0,30:BORDER 0,26:INK 0
,0,26
740 FOR a=15 TO 0 STEP -1:CLG a:NEXT
750 EX=320:MX=50:GOSUB 1630
760 FOR q=1 TO 3000 :NEXT q
770 BORDER 0:INK 0,0:LOCATE 5,10:PRINT "GAME
OVER":LOCATE 5,5:PRINT "SCORE:";score;" "
780 IF INKEY$<>"" THEN 780
790 IF INKEY$<>"" THEN GOTO 210
800 GOTO 790
810 REM hit missile
820 SOUND 132,0:SOUND 4,1000,0,15,3,2,0
830 SPEED INK 2,2:INK a+2,26,0:FOR j=1 TO 800
:NEXT:SPEED INK 10,10:INK a+2,0:y(a)=1000
840 score=score+100
850 miss=miss-1
860 RETURN
870 REM set screen
880 PEN 13
890 CLG 0
900 FOR a=1 TO 4
910 IF ci(a)<>0 THEN LOCATE ci(a),22:PRINT CH
R$(128);CHR$(129);
920 NEXT a
930 PEN 14:INK 14,6
940 REM FOR a=1 TO 23:LOCATE 1,a:PRINT CHR$(1
30):LOCATE 20,a:PRINT CHR$(130):NEXT a
950 LOCATE 1,24:PRINT STRING$(20,CHR$(131));

960 PEN 1
970 LOCATE 1,25:PRINT STRING$(20,130);
980 MOVE 16,48:DRAWR 600,0,1
990 RETURN
1000 REM MOVE BASES
1010 af=0:uf=0
1020 IF (JOY(0) AND 2) AND cu<20 THEN cu=cu+1
:uf=1
1030 IF (JOY(0) AND 1) AND cu>1 THEN cu=cu-1:
uf=1
1040 IF (JOY(0) AND 8) AND ca<17 THEN ca=ca+1
:af=1
1050 IF (JOY(0) AND 4) AND ca>1 THEN ca=ca-1:
af=1
1060 IF (JOY(0) AND 16) AND fc=0 AND ammo>0 T
HEN fu=cu+1:fa=ca+1:fc=1:LOCATE ammo,25:PRINT
 " ";:ammo=ammo-1:SOUND 1,500,0,0,1,1,5
1070 IF af=1 THEN LOCATE ca,23:PRINT a$
1080 IF uf=1 THEN LOCATE 1,cu:PRINT u$
1090 RETURN
1100 REM user defined graphics
1110 SYMBOL AFTER 128
1120 SYMBOL 128,0,48,48,48,54,62,62,255
1130 SYMBOL 129,0,0,192,204,204,252,252,255
1140 SYMBOL 130,24,24,24,24,24,24,60,126
1150 SYMBOL 131,219,219,0,111,111,0,238,238
1160 SYMBOL 132,0,0,60,60,60,60,0,0
1170 SYMBOL 133,137,82,60,190,125,60,74,145
1180 SYMBOL 134,137,32,11,192,16,74,145

1190 RETURN
1200 DATA 144,132,133,134,133,132,144,32
1210 REM missile hit city
```

```
1220 IF Y(A)=1000 THEN RETURN
1230 FOR j=26 TO 0 STEP -1:INK a+2,j:CALL &BD
19:NEXT
1240 SOUND 135,0,0,15,2,0,31
1250 Y(A)=1000:MX=25:EX=X(A):GOSUB 1630
1260 miss=miss-1
1270 cities=cities-1
1280 sub=sub+1
1290 w=1+INT(INT(x(a))/32)
1300 IF w=4 OR w=5 THEN ci(1)=0:q=4
1310 IF w=8 OR w=9 THEN ci(2)=0:q=8
1320 IF w=12 OR w=13 THEN ci(3)=0:q=12
1330 IF w=16 OR w=17 THEN ci(4)=0:q=16
1340 LOCATE q,22:PRINT CHR$(95);CHR$(95)
1350 RETURN
1360 REM missile hit ground
1370 IF y(a)=1000 THEN RETURN
1380 SOUND 132,0:SOUND 4,2000,0,15,2
1390 FOR j=26 TO 0 STEP -1:INK a+2,j:SOUND 1,
0,5,15,0,0,J:CALL &BD19:NEXT
1400 MX=10:EX=X(A):GOSUB 1630
1410 y(a)=1000
1420 miss=miss-1
1430 sub=sub+1
1440 RETURN
1450 REM FIRE
1460 PEN 15
1470 LOCATE fa,fu
1480 PRINT CHR$(ex(fc))
1490 fc=fc+1
1500 IF fc=9 THEN fc=0
1510 PEN 1
1520 RETURN
1530 MODE 1
1540 PRINT CHR$(150);STRING$(38,154);CHR$(156
);
1550 PRINT CHR$(149);"         C I T Y   D E F
 E N C E        ";CHR$(149);
1560 PRINT CHR$(147);STRING$(38,154);CHR$(153
)
1570 PRINT:PRINT" Your task is simple-

      Prevent the total destruction of your
                                          wor
ld by stopping ICBM's from hitting

1580    PRINT"their targets - your four major
cities.
   Your only weapon is a Twin Anti-Matter
                                      Cannon.
One cannon fires Positrons,one
                              ";
1590    PRINT"fires Electrons - a huge explosi
on is
   created where they meet,destroying any
                                      Missile
s within range."
1600 PRINT:PRINT"          PRESS SPACE-BAR TO B
EGIN"
1610 IF INKEY$<>" " THEN 1610
1620 RETURN
1630 REM EXPLOSION
1640 LOCATE 1,1:PRINT CHR$(23);CHR$(1)
1650 FOR L=1 TO 2
1660 FOR M=1 TO MX STEP 2
1670 MOVE EX,48
1680 DRAWR -10*M,M,(M MOD 3)+1:DRAWR 7*M,2*M:
DRAWR -3*M,4*M:DRAWR 4*M,-2*M:DRAWR 2*M,3*M
1690 DRAWR 2*M,-3*M:DRAWR 4*M,2*M:DRAWR -3*M,
-4*M:DRAWR 7*M,-2*M:DRAWR -10*M,-M
1700 NEXT
1710 NEXT
1720 LOCATE 1,1:PRINT CHR$(23);CHR$(0)
1730 RETURN
1740 REM TITLE SCREEN
1750 MODE 0
1760 INK 0,0:INK 1,26:INK 15,10:BORDER 0
1770 COL=1
1780 Y=200:DY=1
1790 MOVE 0,Y
1800 DRAWR 640,0,COL
1810 MOVE 0,400-Y
1820 DRAWR 640,0
1830 COL=COL+1:IF COL=15 THEN COL=1
1840 Y=Y-DY
1850 DY=DY*1.1
1860 IF Y>0 THEN 1790
1870 FOR x=0 TO 640 STEP 40
1880 r=INT(RND*50)+10
1890 FOR z=1 TO 35 STEP 4
1900 MOVE x+z,200:DRAWR 0,r,15
1910 NEXT
1920 NEXT
1930 DATA C,I,T,Y," ",D,E,F,E,N,C,E,......,Y,D
,E,N,N,E,K,.,J,...,Y,B,...
1940 RESTORE 1930
1950 DEG
1960 TAG
1970 FOR A=13 TO -16 STEP -1
1980 PLOT 1000,1000,COL
1990 MOVE 320+COS(A*12)*200,200+SIN(A*12)*80
2000 READ Q$:PRINT Q$;
2010 COL=COL+1:IF COL=16 THEN COL=1
2020 NEXT
2030 TAGOFF
2040 LOCATE 5,24
2050 PRINT "PRESS SPACE TO START";
2060 COL=1
2070 INK COL,26
2080 IF COL=1 THEN INK 14,13 ELSE INK COL-1,1
3
2090 FOR T=1 TO 2:CALL &BD19:NEXT
2100 COL=COL+1:IF COL=15 THEN COL=1
2110 IF INKEY$="" THEN 2070
2120 TAGOFF
2130 RETURN
```

TOWNSHIP 2000

◆ CBM 64 ● Simon Eyre ● Sheffield

Township 2000 is a survival type game rather like the program 'kingdom'. It is, different in the way that you are the ruler of a computer software nation. It is your awesome task to decide the distribution of your troops how much food you will need and how many tapes you anticipate to buy and sell. You should bear in mind that the more tapes you buy the less food you can provide for your country but on the other hand if you don't buy enough tapes you will risk bankruptcy.

You continue your reign until you run dry of subjects or funds.

```
10 POKE53280,11:POKE53281,12:PRINT"(CLR)
"
20 GOSUB1000
25 FORMN=1TO5
30 GOSUB2000
40 GOSUB3000
50 GOSUB4000
60 GOSUB5000
70 GOSUB6000
80 NEXT
90 Y=Y+1:GOTO25
100 GOTO30
1000 SC=53281:BC=53280
1010 AR=0:MO=650:FO=0
1020 MA=0:PO=100:GM=0
1030 Y=2000
1040 FORI=0TO62:READA:POKE832+I,A:NEXT
1063 PRINT"(DOWN)(DOWN)(RIGHT)(RIGHT)(RE
D)PLEASE PRESS A KEY FOR INSTRUCTIONS"
1070 POKE198,0:WAIT198,1:POKE198,0
1075 POKESC,0:POKEBC,0
1080 READA$:IFA$="***"THEN1150
1085 IFA$="+++"THENPOKE198,0:WAIT198,1:P
OKE198,0:GOTO1080
1090 L=LEN(A$)
1100 FORT=1TOL
1110 PRINTMID$(A$,T,1);
1120 FORX=1TO20
1130 NEXTX,T
1140 GOTO1080
1150 RETURN
1999 END
```

```
2000 PRINT"(CLR)(RIGHT)(RIGHT)(C=7)TOWNS
HIP 2000 BY SIMON EYRE (C=3)YEAR:";Y
2100 REM
2120 PRINT"(YEL)(RVS)(RIGHT)(RIGHT)(C=U)
(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)
(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)
(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)
(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)
(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)(C=U)";
2125 IFXX=1THENRETURN
2130 PRINT"(WHT)(OFF)(RIGHT)(RIGHT)POPUL
ATION:";PO
2140 PRINT"(C=3)(RIGHT)(RIGHT)SOLDIERS
:":AR
2150 PRINT"(WHT)(RIGHT)(RIGHT)FOOD
:";FO
2160 PRINT"(C=3)(RIGHT)(RIGHT)MAG TAPES
:";MA
2165 PRINT"(WHT)(RIGHT)(RIGHT)MONEY
:";MO
2170 PRINT"(RVS)(RED)     PLEASE PRESS AN
Y KEY TO CONTINUE    ";
2180 POKE198,0:WAIT198,1:POK '98,0:RETUR
N
3000 POKESC,2:POKEBC,0:PRINT"(CLR)(BLK)"
;
3010 PRINT"(OFF)(DOWN)(RIGHT)YOU AND SOM
E OF YOUR ADVISERS HAVE"
3020 PRINT"(DOWN)TRAVELLED TO MARKET TO
TRY AND BUY SOME"
3030 PRINT"(DOWN)MAGNETIC TAPE TO STORE
YOUR WONDERFUL"
3040 PRINT"(DOWN)PROGRAMS ON."
3050 PRINT"(DOWN)(RIGHT)(C=6)YOUR TOWNSH
IP HAS";MO;"TARES TO ITS"
3060 PRINT"(DOWN)CREDIT AND THE VALUE OF
 TAPE IS 5 T.."
3070 PRINT"(BLK)(DOWN)(RIGHT)HOW MANY TA
PES DO YOU REQUIRE.?."
3080 INPUTTP:IF(TP*5)>MOTHENPRINT"(WHT)(
RVS)  YOU DON'T HAVE ENOUGH TARES  (BLK)
":GOTO3080
3090 MO=MO-(TP*5):MA=MA+TP
3100 RETURN
4000 POKESC,14:POKEBC,6:PRINT"(CLR)"
4010 PRINT"(BLK)(RIGHT)YOU MOVE ON THE F
EDERAL FOOD STORES ON"
4020 PRINT"(DOWN)THE PLANET MEDDESSA.HER
E YOU CAN BUY THE";
4030 PRINT"(DOWN)FOOD THAT YOUR";PO;"PEO
PLE MAY NEED FOR"
4040 PRINT"(DOWN)THE COMING MONTH."
4050 PRINT"(DOWN)(RIGHT)(C=4)FOOD COSTS
4 TARES A KILO GEM AND YOU"
4060 PRINT"POSSESS";MO;" TARES.."
4070 PRINT"(DOWN)(WHT)HOW MANY KILO GEMS
 DO YOU WANT.?."
4080 INPUTKG:IF(KG*4)>MOTHENPRINT"(BLK)(
RVS)  YOU HAVE NOT ENOUGH MONEY  (WHT)":
GOTO4080
4090 FO=FO+KG:MO=MO-(KG*4):RETURN
5000 POKEBC,11:POKESC,12:PRINT"(CLR)(BLK
)";
5010 PRINT"(DOWN)(RIGHT)YOU RETURN BACK
TO YOUR PEOPLE WITH"
5020 PRINT"(DOWN)ALL THE SUPPLIES YOU NE
ED. YOU SIT ON"
5030 PRINT"(DOWN)YOUR THRONE AND LOOK UP
 INTO THE ORANGE"
5040 PRINT"(DOWN)MOUNTAINS. YOU KNOW THA
T THE ALIENS OF"
5050 PRINT"(DOWN)SINCLAIR COULD INVADE Y
OUR TOWNSHIP.."
5060 PRINT"(DOWN)YOU DECIDE TO CHANGE TH
E NUMBERS THAT"
5070 PRINT"(DOWN)MAKE UP YOUR ARMIES."
5080 PRINT"(DOWN)(WHT)(RIGHT)EVERY SOLDI
ER IS PAYED 2 TARES AND"
5090 PRINT"(DOWN)CANNOT MAKE ANY SOFTWAR
E."
5100 PRINT"(C=8)(RIGHT)(DOWN)YOU HAVE";P
O;"PEOPLE AVAILABLE AND YOU"
5110 PRINT"HAVE";MO;"TARES
5120 PRINT"(BLK)HOW MANY ARE THERE TO BE
 IN THE ARMY.?."
5130 INPUTA:IFA>POTHENPRINT"(WHT)(RVS) T
HE POPULATION IS NOT LARGE ENOUGH (BLK)"
:GOTO5130
5140 IF(A*2)>MOTHENPRINT"(WHT)(RVS) YOU
HAVE LITTLE ENOUGH MONEY (BLK)":GOTO5130
5150 AR=AR+A:MO=MO-(A*2):RETURN
6000 POKESC,0:POKEBC,0
6010 IFINT(RND(1)*100)+1<50THENGOTO6015
6012 GOTO6030
6015 XX=1:GOSUB2000:XX=0
6020 PRINT"(DOWN)(C=7)****************ALI
EN ATTACK**************":GOTO6500
6030 LV=PO-FO:IFLV<0THENLV=0
6040 PO=PO-LV:FO=FO-PO:IFFO<0THENFO=0
6050 POKESC,3:POKEBC,6:PRINT"(CLR)(BLU)"
;
6060 PRINT"(DOWN)YOU LOST";LV;" PEOPLE T
HROUGH STARVATION"
6065 BB=INT(RND(1)*15)+1:PO=PO+BB
6070 PRINT"(DOWN)";BB;"BABIES WERE BORN.
"
6080 TS=PO-AR:IFMA<TSTHENTS=MA:MO=MO+(TS
*8)
6085 MA=MA-(PO-AR)
6090 PRINT"(DOWN)YOU SOLD";TS;"TAPES WHI
CH YOU SOLD FOR"
6100 PRINT"(DOWN)A TOTAL OF";TS*8;"TARES
."
6105 MO=MO+(TS*8)
6110 IFMO=<0THEN7000
6120 IFPO=<0THEN8000
6130 PRINT"(DOWN)(DOWN)(BLU)(RVS)::::::
::::PLEASE PRESS A KEY::::::::::"
6140 POKE198,0:WAIT198,1:POKE198,0
6150 POKESC,0:POKEBC,0:RETURN
6500 NA=INT(RND(1)*20)+1
6510 V=53248:POKEV+21,4:POKE2042,13
6520 FORX=0TO200:POKEV+4,X:POKEV+5,65
6530 NEXT
6540 FORI=0TO10:FORT=0TO8:POKEBC,T:NEXTT
,I
6550 FORX=200TO0STEP-1:POKEV+4,X:NEXT
6560 POKEV+21,0
6570 AR=AR-NA:IFAR=0THENPO=PO-INT(RND(1)
*10)+1:AR=0
6580 FO=FO-NA
6590 PRINT"(WHT)LOTS OF PEOPLE TAKEN AWA
Y TO BE EATEN.."
6600 PRINT"(WHT)THE ARMY WAS REDUCED BY"
;NA;"SOLDIERS"
6610 PRINT"NEW POPULATION COUNT =";PO
6620 FORI=1TO5000:NEXT:GOTO6030
7000 PRINT"(DOWN)(DOWN)(BLK)(RIGHT)YOUR
FUNDS HAVE RAN DRY AND THE ONCE"
7010 PRINT"LOYAL SUBJECTS REBEL AGAINST
YOU.."
7020 PRINT"YOU ARE SENT OUT TO THE MOUNT
AINS WHERE"
7030 PRINT"YOU WILL BE LEFT TO THE ALIEN
S.."
7040 PRINT"(DOWN)(RED)(RIGHT)WOULD YOU L
IKE TO PLAY AGAIN (Y/N)"
7050 GETA$:IFA$=""THEN7050
7060 IFA$="Y"THENRUN
7070 END
8000 PRINT"(DOWN)(DOWN)(BLK)(RIGHT)YOUR
PEOPLE ARE ALL DEAD AND THE EVIL"
8010 PRINT"ALIENS TAKE OVER THE GHOST TO
WN.."
8020 GOTO7040
10000 DATA0,0,0,0,0,0,0,16,0,0,56,0,0,56
,0,0,255,0
10010 DATA3,171,192,15,109,240,63,255,25
2,115,195,206
10020 DATA97,129,134,115,195,206,31,255,
248,3,255,192
10030 DATA1,60,128,2,0,64,4,0,32,4,0,32,
4,0,32,31,0,248,0,0,0
10040 DATA"***"

READY.
```

MICRO MARKET

CLOCK FOR THE BBC

◆ BBC ● Robert Banner ● Ilford, Essex

"Clock" which runs very successfully on the BBC has a display equal to any. The ANALOGUE CLOCK is a large bold clock with hour, minute and second hands. Under the clock is a digital display; both are simultaneously synchronised from the user's input of the time.

```
10 REM ** Computer Clock **
20 REM ** By Robert Banner
   20/1/1986 **
30 MODE1 VDU23;8202;0;0;0;
40 *FX229,1
50 VDU29,640;512;
60 COLOUR130:COLOUR0:GCOL0,129
70 PROCINITIALIZE
80 PROCSET
90 CLS:PRINTTAB(0,7)"Press <SPACE BAR> to
see clock"
100 IF GET<>32 THEN 100
110 PROCSCREENDISPLAY
120 PROCSTART
130 REPEAT
140 PROCCLOCK
150 UNTIL INKEY(-33)
160 FOR A=1 TO 2000:NEXT
170 CLS
180 PRINTTAB(0,7)"Do you wish to start agai
n (Y/N) ?"
190 *FX15,1
200 A$=GET$:IF INSTR("YNyn",A$)=0 THEN 200
210 IF INSTR("Yy",A$)>0 THEN RUN
220 MODE7
230 PRINT''"PROGRAM TERMINATED"
240 END
250 DEF PROCSCREENDISPLAY
260 CLG:GCOL0,0:MOVE0,350:FOR A=0 TO 2*PI+P
I/20 STEP PI/20:DRAW350*SINA,350*COSA:NEXT
270 GCOL0,3:FOR A=-349 TO 349:PLOT77,0,A:NE
XT
280 GCOL0,0:VDU5:FOR A=PI/6 TO 2*PI STEP PI
/6:MOVE290*SINA-16,290*COSA+16:IF A/(PI/6)=10
 THEN PRINT"10" ELSE PRINT;A/(PI/6)
290 MOVE320*SINA,320*COSA:DRAW350*SINA,350*
COSA:NEXT:VDU4
300 PROCPRINTDATE
310 ENDPROC
320 DEF PROCSET
330 CLS:PRINTTAB(0,7)"Enter the date in the
 following format:"
340 INPUT "Year: "YR:IF YR<1 THEN VDU7:GOTO
 330
350 INPUT "Month (in numbers 1-12): "MON:IF
 MON<1 OR MON>12 THEN VDU7:GOTO 350
360 INPUT "Date: "D:IF D<1 THEN VDU7:GOTO 3
60
370 IF (MON=2 AND YR MOD 4=0 AND D>29) THEN
 VDU7:GOTO 360
380 IF YR MOD 4<>0 AND D>MTH(MON) THEN VDU7
:GOTO 360
390 CLS:PROCPRINTDATE
400 PRINT'"Is this alright (Y/N) ?"
410 A$=GET$:IF INSTR("YNyn",A$)=0 THEN 410
420 IF INSTR("Nn",A$)>0 THEN 330
430 CLS:PRINTTAB(0,7)"Enter time, using the
 24 HOUR CLOCK,    in the following format:"
440 INPUT'"Enter hour: "H

450 IF H<0 OR H>23 THEN VDU7:GOTO 440
460 INPUT "Enter minutes: "M
470 IF M<0 OR M>59 THEN VDU7:GOTO 460
480 INPUT "Enter seconds: "S
490 IF S<0 OR S>59 THN 1120
500 PROCCONVTIME:PRINT''"Time = ";H$;":";M$
;"/";S$;"  (Y/N) ?"
510 A$=GET$:IF INSTR("YNyn",A$)=0 THEN 510
520 IF INSTR("Nn",A$)>0 THEN 430
530 TIME=(H*360000)+(M*6000)+(S*100)
540 ENDPROC
550 DEF PROCSTART
560 GCOL4,1
570 PROCTIME:HH=FNPROCHH(K):MH=FNPROCMHSH(M
):SH=FNPROCMHSH(S):PROCCONVTIME:PROCDHH:PROCD
MH:PROCDSH:PROCDIGITAL
580 OK=K:OM=M:OS=S
590 ENDPROC
600 DEF PROCTIME
610 IF TIME>=8640000 THEN TIME=TIME-8640000
:PROCCHANGEDATE
620 H=INT(TIME/360000):M=INT((TIME/6000)-(H
650 DEF FNPROCHH(K)
660 =RAD(K*30)
670 DEF FNPROCMHSH(MHSH)
680 =RAD(MHSH*6)
690 DEF PROCDHH
700 MOVE50*SIN(HH-PI/2),50*COS(HH-PI/2):MOV
E50*SIN(HH+PI/2),50*COS(HH+PI/2):PLOT85,200*S
INHH,200*COSHH
710 ENDPROC
720 DEF PROCDMH
730 MOVE25*SIN(MH-PI/2),25*COS(MH-PI/2):MOV
E25*SIN(MH+PI/2),25*COS(MH+PI/2):PLOT85,300*S
INMH,300*COSMH
740 ENDPROC
750 DEF PROCDSH
760 MOVE0,0:DRAW300*SINSH,300*COSSH
770 ENDPROC
780 DEF PROCDIGITAL
790 PRINTTAB(16,29)H$;":";M$;"/";S$
800 ENDPROC
810 DEF PROCCLOCK
820 PROCTIME
830 PROCCONVERT(H):H$=Z0$:PROCCONVERT(M):M$
=Z0$:PROCCONVERT(S):S$=Z0$
840 PROCCONVTIME
850 IF OK<>K THEN HH=FNPROCHH(OK):PROCDHH:H
H=FNPROCHH(K):PROCDHH:OK=K
860 IF OM<>M THEN MH=FNPROCMHSH(OM):PROCDMH
:MH=FNPROCMHSH(M):PROCDMH:OM=M
870 IF OS<>S THEN SH=FNPROCMHSH(OS):PROCDSH
:SH=FNPROCMHSH(S):PROCDSH:OS=S
880 PROCDIGITAL
890 ENDPROC
900 DEF FNPROCK
910 =H+INT(M/10)/10*2


920 DEF PROCINITIALIZE
930 DIM MTH(12),MTH$(12)
940 FOR A=1 TO 12:READ MTH(A):NEXT
950 FOR A=1 TO 12:READ MTH$(A):NEXT
960 ST$=" 1 21 31 ":ND$=" 2 22 ":RD$=" 3 23
 ":TH$=" 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 24 25 26 27 28 29 30 "
970 ENDPROC
980 DEF PROCLETTERS
990 IF INSTR(ST$," "+STR$(D)+" ")<>0 THEN P
RINT"st";
1000 IF INSTR(ND$," "+STR$(D)+" ")<>0 THEN P
RINT"nd";
1010 IF INSTR(RD$," "+STR$(D)+" ")<>0 THEN P
RINT"rd";
1020 IF INSTR(TH$," "+STR$(D)+" ")<>0 THEN P
RINT"th";
1030 ENDPROC
1040 DEF PROCPRINTDATE
1050 PROCCONVERT(D):D$=Z0$:PROCCONVERT(YR):Y
R$=Z0$:PRINTTAB((39-LEN(MTH$(MON)+D$+"     "+Y
R$))/2,3)MTH$(MON);" ";D$;:PROCLETTERS:PRINT"
, ";YR$
1060 ENDPROC
1070 DEF PROCCHANGEDATE
1080 D=D+1
1090 IF (YR MOD 4<>0 OR MON<>2) THEN 1110
1100 IF D>29 THEN D=1:MON=MON+1:GOTO 1130 EL
SE GOTO 1130
1110 IF D>MTH(MON) THEN D=1:MON=MON+1
1120 IF MON=13 THEN MON=1:YR=YR+1
1130 COLOUR129:PRINTTAB(0,3)STRING$(39," "):
COLOUR130:PROCPRINTDATE
1140 ENDPROC
1150 DATA 31,28,31,30,31,30,31,31,30,31,30,3
1
1160 DEF PROCCONVERT(Z0)
1170 Z0$=STR$(Z0):FOR Z=1 TO LEN(Z0$):IF MID
$(Z0$,Z,1)="0" THEN Z0$=LEFT$(Z0$,Z-1)+"O"+RI
GHT$(Z0$,LEN(Z0$)-Z)
1180 NEXT
1190 ENDPROC
1200 DEF PROCCONVTIME
1210 PROCCONVERT(H):H$=Z0$:PROCCONVERT(M):M$
=Z0$:PROCCONVERT(S):S$=Z0$
1220 IF LEN(H$)=1 THEN H$="O"+H$
1230 IF LEN(M$)=1 THEN M$="O"+M$
1240 IF LEN(S$)=1 THEN S$="O"+S$
1250 ENDPROC
```

KALEIDOSCOPE

◆ Spectrum ● Derek Beverage ● Newton Mearns, Glasgow

Maze Run is a 'beat the clock' style of game. You have been trapped inside the inner maze and your only chance is to escape from within. There is a score table which records the quickest time achieved.

Type in the list and save it with SAVE "MAZE RUN" LINE 10. The keys are as follows: P = right; C = left; A + up; Z = down.

The graphics characters are as follows: "A" in line 530 and 9020, "B" in line 246, 249 and 251, "C" in line 247 and 248, "D" in line 245 and 250.

```
100 POKE53280,0:POKE53281,0
101 DIMA1(7)
102 FORI=0TO7:A1(I)=2↑(7-I):NEXT
103 POKE53272,PEEK(53272)OR8
104 POKE53265,PEEK(53265)OR32
105 FORC=50000TO50029
106 READB:POKEC,B
107 NEXTC
108 POKE251,0:POKE252,4:POKE253,232
109 POKE254,7:POKE50000,5:SYS50001
110 POKE251,0:POKE252,32:POKE253,64
111 POKE254,63:POKE50000,0:SYS50001
112 X=100:Y=70
113 A2=INT(RND(1)*3-1)
114 A3=INT(RND(1)*3-1)
115 IFA2=0ANDA3=0THEN112
116 A5=Y:A4=X:GOSUB134
117 A4=319-X:GOSUB134
118 A5=199-Y:GOSUB134
119 A4=X:GOSUB134
120 A5=Y*2:A4=X*2:GOSUB134
121 A4=319-A4:GOSUB134
122 A5=199-A5:GOSUB134
123 A4=X*2:GOSUB134
124 X=X+A2*2:Y=Y+A3*2
125 IFX<0ORX>159THENA2=-A2:GOTO124
126 IFY<0ORY>99THENA3=-A3:GOTO124
127 IFRND(1)>.9THENA2=INT(RND(1)*3-1)
128 IFRND(1)>.9THENA3=INT(RND(1)*3-1)
129 IFA2<>0ORA3<>0THEN116
130 A2=INT(RND(1)*3-1)
131 A3=INT(RND(1)*3-1)
132 IFA2=0ANDA3=0THEN130
133 GOTO116
134 A7=INT(A5/8):A9=A5-A7*8
135 A6=INT(A4/8):A8=A4-A6*8
136 A1=8*1024+A7*320+A6*8+A9:B1=A1(A8)
137 POKEA1,PEEK(A1)ORB1:RETURN
138 DATA 0,165,252,197,254,208,7,165
139 DATA 251,197,253,208,1,96,160,0
140 DATA 173,80,195,145,251,230,251
141 DATA 208,232,230,252,76,81,195
READY.
```

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37-way	£0.65	£0.85
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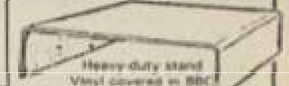
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DREAM MACHINE

The Pied Piper must be behind it all. The famous musician of Hamelin was one of the first great rodent-lovers of history and used a simple Top 40 melody to get all the town's rats to follow his tune.

I would not be surprised if he were a silent partner in Digital Research, which sings a tune called GEM – Graphics Environment Manager – which has induced an entire army of mouse-driven micros to follow it into the unknown lands of user-friendliness. So far, Olivetti, Apricot, Atari and Acorn have all followed the GEM piper and offered the Apple Macintosh-like interface on their new micros.

GEM took off last year when companies like Olivetti and Apricot agreed to offer the easy-to-use system bundled on disc to run under MS-DOS with their business micros and it was given a further boost when it was revealed that Atari was to put GEM in ROM on its Macintosh-like 520ST micro. For most BBC micro users, the best news was when Acorn announced that GEM would be the cornerstone of its Master 512 edition of the new Master series micros.

Price only snag

Long-suffering BBC owners, who had soldiered on using ROM-based icon and mouse systems in the machine's original miserly 32K of RAM, were 'all ears' when Acorn talked of a 512K RAM machine which would use the fast Intel 80186 co-processor – along with a variant of the BBC B 6502 to ensure compatibility with the majority of existing BBC software – and be bundled with the DOS+ MS-DOS compatible operating system, the Digital Research GEM collection – comprising GEM Write, GEM Paint and GEM Desk Top – and a two-button mouse.

The only snag was the price – less than £1,000, a marketing euphemism commonly interpreted as £999.99. The question of whether or not it is worth buying an MS-DOS machine for £1,000 without disc drives or a monitor is examined in a comparison with the £500 Torch Graduate add-on system for the BBC Model B.

That price puts the Master 512 firmly in the category of machines to dream about, or at least save for, and we provide some fodder for those reveries, giving you a detailed preview of this exceptional machine.

The first thing one notices about the Master 512 is that it is in need of a few essential parts to have it work properly. To run the GEM-based software provided with the machine you need 40-track or 80-track disc drives – at least an additional £250 – and a reasonable monochrome or colour monitor, costing anywhere from £100 to £400. Once you have done that, you will have a dual-drive colour system for about the £1,600 mark.

Easier to use

GEM boots-up from one of the disc drives using the MS-DOS autoexec routine and runs through its paces just as it would on a Compaq, Olivetti or IBM PC. In very short order – the 80186 processor is fast – you are greeted with the new GEM Desk Top. Do not be surprised if it looks a little different from what you have been used to seeing on the Atari version of GEM, as the Master 512 uses the latest version of GEM which, in agreement with Apple, has been changed so that it looks a little less like the Macintosh.

Although it may seem a little less intuitive when you look at it, the Master 512 version of the GEM Desk Top is easier to use because of those changes. You can no longer size your windows for disc drive contents so that they cover each other and the width of the desk-top windows is fixed so that you do not have to scroll both sideways and vertically to read the contents of the drive.

After that, GEM on the Master 512 is very much like GEM on any other machine but a good deal faster than it runs on the IBM PC and compatibles. That can be attributed to the clock speed of the Intel 80186 co-processor used in the machine, which runs at a lightning 8MHz.

The abandonment by Digital Research of GEM Write and GEM Paint for the Atari 520ST in the U.K. means that the Master 512 is in the special position of being the only home micro with those two GEM applications bundled in the price, unless you count the ill-fated and discountinued Apricot Portable and F-series machines. That is probably one of the biggest factors in favour of the machine.

GEM Write is a full-function word-processor which makes use of mouse input, pull-down menus, vertical and horizontal scrolling and the ability to mix text and graphics a la Apple Macintosh. It does not, however, let you use the big library of fonts you may have seen on the Apple machine. The GEM Write developers say that is because it would have curtailed the speed of operation too much and I would tend to agree with them. As GEM Write was developed first to run on the IBM PC, there is no way the package would have been even usable if the machine had constantly to generate the graphics necessary for such fonts.

Anyway, back to the Master 512. The Acorn machine has no speed problems with the GEM software and it seems to be compatible with the IBM format for GEM. To test that, I used a disc containing a document written with the IBM PC under GEM Write and put it in one of the Master 512 disc drives. It read the file perfectly, even preserving the hierarchical directories on my disc and bringing up the format

Master Performance at half the price

If the budget for your dream machine does not run to the £1,000 plus it will cost for a full Master 512 machine up and running but you still want a BBC with MS-DOS and access to IBM PC data files – and even programs – the Torch Graduate add-on for the BBC B will be of considerable interest.

The Graduate system costs £499, includes twin 40-track disc drives which can be used to run either IBM PC software or some 40-track BBC micro software, without the need for a disc interface, and is bundled with the Psion Xchange suite of integrated business software applications. Of course, you need a BBC and a monitor but the average Model B, when you can find them, will not cost much more than £300 and a reasonable black and white monitor can be bought for about £100, giving you a full system with similar specification to the Master 512 for about £900.

The Graduate first appeared as an add-on developed by ex-Torch founder Martin Vlieland-Boddy's Data Technologies company, which tried to market the system by mail order through computer magazines.

Data Technologies soon found that Vlieland-Boddy's old company was interested in



MASTER 512



file which tells GEM Write about line-spacing, tabs, and left and right margins.

Don't think that the Master 512 is any kind of IBM compatible; I didn't say that but it seems the machine will read and write IBM PC data files, so that if you are fortunate enough to have an IBM PC running GEM at the office and a Master 512 at home, you can take home your discs to work on.

Enough about GEM; what about the rest of the machine? It looks in every way like the Master 128 – except, of course, for the nameplate – and has the same 128K ROM with BBC Basic v 4.0, Edit program/text editor, View word-processor, ADFS disc filing system and BBC B+ DFS-compatible ROM. It also includes the massive number of standard interfaces for which the BBC has always been famous – RS423, parallel printer, optional Econet, Tube high-speed communications, 1MHz bus, disc interface, user port and analogue input, to name a few.

Upgrading

As you probably know, the Master 128 can be upgraded into the Master 512 – or into any of the other variants in the Acorn Master line – for about the same as the difference in price between the two machines; you will not have much change from £500. For that, you will have a faster, beefier machine with plenty of RAM – although just how much of that will be available in BBC mode is not entirely clear – and GEM.

The latter is probably the most important as it means that the Master 512 will not only be open to the already huge base of BBC software but also to the growing base of GEM software being developed round the Atari 520ST and the IBM PC GEM system.

As Digital Research claims that GEM software on one machine can be converted to another within about a week using its software tools, that means there could soon be plenty of exciting new GEM-based software for the machine. – *Geof Wheelwright.*



buying the rights to the system and a deal was arranged with Torch, which had already enjoyed a good deal of success selling its Z-80 second processor-based CP/M-lookalike Torch pack and a more upmarket Unix add-on, Unicorn. After a few hiccoughs and delays, the Torch Graduate finally started being shipped in big numbers last summer for about £1,000.

The price has now been reduced to £500 and, on first inspection, the system looks like a very good deal. The machine is a large, squat box with an annoyingly-short cable which connects to the BBC 1MHz bus. Apart from plugging it into the mains, no other connections are necessary, as there are no ROMs or DFS chips to install.

Measuring 6in. high, 10in. wide and 16in. deep, the Graduate is too big to rest conveniently to the right of the keyboard but, turned on its side, it can be placed further back beside the monitor, or to the left of the keyboard. The Graduate houses two 40-track floppy drives, each capable of storing 360K, which lay above the main circuit board. That, in turn, houses the 16-bit 8088 processor running at 5MHz and two IBM-compatible expansion slots for extra memory – up to 640K – and internal modems, interfaces or graphic enhancements. An integral power supply and fan are also included, relieving any strain on the BBC power supply.

The BBC is unaffected by the Graduate until the latter is switched on. Initially the screen clears while memory checks are performed and, provided the correct disc is inserted, MS-DOS is loaded. Using the BBC 80-column mode – mode 3 – a completely new character set is defined.

Provided with the Graduate is a suite of Psion Xchange programs, already renowned on the IBM and the Sinclair QL computer. They include a word processor, spreadsheet, database and graphics program. Collectively, the programs make an excellent and professional applications suite and enhance the value of the Graduate package significantly.

IBM PC compatibility is limited on the Graduate, largely because certain keys on the IBM keyboard do not appear on the BBC. We used it with Framework Version 1, Xchange and several PC games programs and Torch promises that the device will allow you to run programs including Lotus 1-2-3, Open Access, Smart, the Perfect Software range, Wordstar and the PFS suite.

The display is also a compromise IBM colour output as only four colours can be shown in 80-column mode. While most business software will work, any program which addresses the internal hardware, such as the Microsoft Flight Simulator, is confused by the differences and crashes. If the program is straightforward, uses only two or three colours, and follows the rules of PC-DOS it should work, as should most expansion cards. The expansion card capability means that you can upgrade to memory to the 640K limit of MS-DOS and that colour cards to true IBM colour or mono display can be achieved.

Bearing that in mind, the Graduate, as its name suggests, is best-suited for BBC owners who want PC-DOS or at least MS-DOS compatibility only for business applications. The bundled Psion suite is excellent and the IBM PC version of it used to sell for £500 alone. If you already own a BBC and are considering the Master 512 for its 16-bit MS-DOS capabilities and are not too concerned about GEM, which ran with difficulty in our test on the Graduate, you would do well to look at the £500 Torch Graduate as an active alternative to the Acorn £1,000 disc-less Master 512.

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Your COMPUTER COURSE

Your COMPUTER COURSE

APRIL 1986

A COMPREHENSIVE GUIDE TO PROGRAMMING – PART 2



ORCHESTRAL MANOEUVRES

A MEDLEY OF MICRO MUSIC

STRUCTURED PROGRAMMING

A USEFUL TECHNIQUE – NOT A UNIVERSAL PANACEA

THE POWER OF FORTH

MACHINE CODE, MOVE OVER – FORTH HAS THE SPEED

GUIDE TO COMPUTER JARGON

FROM E TO H IN OUR PLAIN MAN'S GUIDE

The Forth in action

Forth has been used in a variety of applications – Geof Wheelwright describes the ma

In this, the second part of the *Your Computer* Course, we develop some of the themes introduced in last month's instalment. Our main topic this month is music, in particular the use of microcomputers to control synthesisers by way of the internationally-agreed Midi standard. Combining the programming power of a microcomputer with one of the latest, low-cost music synthesisers assures the user of the best of both worlds. Even the tyro musician, with the help of some of the excellent software available, can soon be making the most melodic sounds.

In addition, this month we discuss the Forth language, putting its features into perspective, and look at the pros and cons of the structured programming debate. To some computer users, structured programming is more a religion than a technique. We take a studied view of the arguments for and against a structured approach to programming, putting the arguments of both sides in perspective.

Rounding off this month's course is the second part in John Lettice's guide to computer jargon, in which he explains terms in a way which is both frivilous and fundamental. This month he takes us through the letters E to H.

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Contributors:

John Lettice

Geof Wheelwright

Most of the current crop of popular computer languages available to the micro user have been around for some years. Forth is no exception. Developed in the late 1960s, it had an amazing impact when introduced to the micro world a few years ago.

For an idea of Forth it is worth looking at its history. Forth was developed by Charles H. Moore. He was working at the National Radio Astronomy Centre in Kitt Peak, Arizona, and was very frustrated with the limitations of existing programming languages.

During the next few years, Moore developed a set of programming tools capable of accepting additions. He decided to develop his tools into a control language and Forth was born. Since then, there have been numerous versions of the language, but basically the choice is between two – Forth-77 and Fig-Forth.

Moore developed his Forth system further and it is still in

Forth was developed by Charles Moore to control radio telescopes in Arizona.

use today controlling the guidance system of the radio telescope at Kitt Peak. Since those early days, Forth has been used in a variety of applications. Many popular arcade games are written in Forth. Washing machine manufacturers use it to program their latest models. A variant is even used by many hospitals. Using Forth on home micros tends to be a little less exotic but it is used in a variety of ways. Control applications, such as steering a buggy, is one example but the most common use on home machines is in applications demanding a fast language, which is what Forth is – very fast.

The first point to note about Forth is that it does not use instructions or commands like Basic. Neither is the language restricted to the number of facilities with which it is purchased. Instead, Forth uses words. Every version of it has a set of those words which make up the nucleus of the language, which is referred to as the dictionary.

Just like Basic, but in a more flexible manner, a Forth program can consist of any number or combination of words. VLIST is a Forth word and its purpose is to display the contents of the dictionary. About the only other similarity between Basic and Forth is that Forth has an immediate mode where single commands – words – can be executed. For bigger programs, an editor of some kind is used to enter the source code.

The real difference is the facility of allowing the user to

Forth has been described as a high-level, low-level language because it combines exceptional features.

add to the language. For example, the following word definition will add 2 to the number on top of the stack – explained later – whenever used:

```
: ADD2 2 + ;
```

The syntax of Forth is fairly straightforward. Each word starts with a colon. That is followed by a name which is used whenever the word is to be used. Next follows the definition, which is usually made up from

Forth requires numbers which are to be operated on to be on the stack prior to the operator. In other words, to perform a mathematical function it is necessary to place the operand(s) before the operator(s) and not mix them as humans do:

2 3 + is the equivalent of 2 + 3.

Humans perform calculations in in-fix notation but Forth does it in post-fix notation, known as Reverse Polish Notation. Here are some algebraic expressions in in-fix notation – normal – with their post-fix – Forth – equivalents:

Normal	Forth
A+B	AB+
A+B–C	AB+C–
(A+B)*C	AB+C*
A*B–C/D+E	AB*CD/–E+

It looks confusing at first but it is surprising how easy it is to adapt to it.

The reason why post-fix notation is used is because computers find it much simpler to work with. As a result, that also contributes to Forth speed. In Basic:

```
PRINT 1 + 2
```

requires the interpreter to scan the line, find the 1, look for an operator, find the second number, and so on.

Whenever Forth encounters an operator such as '+', '–' and so on, it ASSUMES that there ARE two numbers already on the stack. Because there is no error-checking on the stack it is for the user to make sure that there are two numbers on the stack; otherwise Forth will report with the ?STACK EMPTY error message. Reverse Polish Notation has been used for some time and some readers may remember the early Hewlett-Packard calculators which operated in that manner.

language

...any popular programs are written in the language. ...advantages of the Forth alternative.

other Forth words. It is possible to create new words from machine code.

Forth has been described by many as the high-level, low-level language. That is because Forth offers such high-level control structures yet requires the user to maintain the stack which is usually a low-level operation required in machine code. The stack, and understanding how to manipulate it, is probably the single most important aspect of learning the language.

The reason is because every Forth word alters the contents of the stack in some way so it is entirely the prerogative of the user to maintain the stack, as there is no error-checking, bound-checking or such like. Even though it is a difficult concept to handle initially, stack manipulation has its rewards with programs which can run at 80 percent of the speed of machine code programs.

The stack is an area of memory used as a temporary storage space for numbers, data and such like. It operates on a first-in, last-out basis and numbers can be added to it – pushed – or removed – popped. To put the number three on the stack in Forth in immediate mode, the following is done:

```
3 <RETURN>
```

This places six on the stack. Adding more words is simple:

```
1 3 2 4 7 63 <RETURN>
```

Removing the numbers from the stack can be done in a number of ways. To print the top value on the stack the dot word '.' is used, which removes the top item of the stack and prints it to the screen:

```
. . . . . . <RETURN>
```

would print

```
21
34
9
2
5
6
```

The reason for the 'backwardsness' is because the first number placed on the stack will be at the bottom and hence the last out.

The two methods of placing numbers on the stack are in the immediate mode, as just detailed, or within a colon definition – a program. Here, a word

Once learned, Forth can be used for a variety of applications ranging from fun and games to utility writing.

called ADD has been defined which adds three and five and prints the result:

```
: ADD 3 5 + . ;
```

By entering ADD, the number nine will be displayed. That is not a very good way to add two numbers so, like Basic, Forth can get the two numbers at run-time:

```
: ADD + . ;
```

To add two numbers the following is entered:

```
2 5 ADD
7 OK
```

Notice the OK which is the equivalent of the Basic Ready prompt.

Using the stack for calculations and storage will guarantee maximum efficiency when using Forth. It is possible to use variables and constants as in Basic, although at a sacrifice of a little speed.

Constants are values which do not change during the execution of the program. Defining a constant is simple:

```
6 CONSTANT SIX
```

Here a constant called SIX has been defined which contains the number six. SIX may then be used in place of the number. Variables are defined in a similar manner:

```
1000 VARIABLE LIMIT
```

This example simply sets up a variable called LIMIT, which has an initial value of 1000. Two operations need to be carried-out to place the value of the variable on to the stack. First, the name of the variable is specified which puts the address where the variables contents are stored on to the stack. The Forth word '@' (fetch) is then used which takes the address and substitutes it with the value of the variable.

LIMIT @ . would display the value of LIMIT. Altering the value of a variable requires three operations. First, the new value must be placed on the stack. That is followed by the variable name which places the address of the variable also on the stack. The '!' – store – word is then used which takes the new value and stores it at the address on the stack.

```
231 LIMIT !
```

This would alter LIMIT to 231.

There is much more to Forth than what is described here. The language has a large number of control constructs, decision-making facilities, and so on. It is a difficult language to learn but that is mainly because the syntax and method of operation is far different from Basic. Once learned, Forth can be used by the micro user for a variety of applications ranging from fun and games to utility writing.

Forth has become the second most popular language available on micros. Owners of the BBC micro have an excellent version of Forth available from Acornsoft. Melbourne House Forth for the Spectrum contains many extra graphics and sound facilities, while Commodore 64 owners have at least five Forth packages from which to choose. I can recommend the Fig-Forth cartridge from Audiogenic. Finally, Amstrad users cannot go wrong with Abersoft Forth, which is one of the fastest Forths I have seen on a Z-80 system.

The following Basic/Forth comparison demonstrates the speed of Forth. The two programs are identical in operation and perform the following:

- Clear the text screen
- Fill the colour map with the value 1, i.e., white.
- POKE to the screen display 26 complete screenfulls.

The result is that a screenful of As will be displayed, then Bs and so on. In Basic the test took 115 seconds to complete on the Commodore 64 and in Melbourne Forth it took 10.23 seconds:

Basic

```
10 PRINT "[CLS]"
20 FOR C=55296 TO
   56296
30 POKE C,1
40 NEXT C
50 FOR L=1 TO 26
60 FOR I=1024 TO 2039
70 POKE I,L
80 NEXT I
90 NEXT L
```

Forth

```
10) : BM1 CLS
20)      56297 55296 DO
30)        1 I C!
40)      LOOP
50)      27 1 DO
60)        2040 1024 DO
70)          J I C!
80)        LOOP
90)      LOOP ;
```

Line 10 in both programs clears the screen. Line 20 sets up an index; the values of the index are the start and end addresses of colour RAM on the 64. Notice in the Forth example that the end address PLUS ONE is specified. Line 30 in both examples POKEs values into the variable C. Similarly, the second loop POKEs values into L and I.

Your COMPUTE

Our off-beat guide to computer-speak
from John Lettice's individualist



■ **Edit:** To insert, move, correct or delete vital parts of a program accidentally.

■ **Editor:** A program or part of a program designed specifically to allow you to delete things accidentally faster.

■ **Electronic publishing:** See Rupert Murdoch. Seriously, though, the advent of laser printer, together with high-resolution graphic screens, means it it feasible to produce finished magazine art work – see *Your Computer* – with only a laser printer and a micro.

■ **Element:** The important part of an electric kettle; alternatively, a single piece of data.

■ **ELSE:** An extension to the IF . . . THEN loop construction which allows for a "false path." So, if I have enough money, THEN I will buy a 520ST. ELSE I will have to settle for an Electron.

■ **EMail:** Short for electronic mail, the transfer of written information from one terminal to another, usually by means of telephone lines and modems. It is a fast and hassle-free means of communication. The copy for this article, for example, was delivered by electronic mail through an Olivetti M-21.

■ **Embedded code:** A piece of machine code inserted to make an otherwise unintelligible program completely unintelligible. Ostensibly it is there to do a job which a Basic listing cannot do but we all know the real reason.

■ **Emulate:** 1, Obsolete term meaning to wish to be Guy Kewney – see *Cambridge Atlas of Ancient Microcomputing*. 2, To imitate a computer to the extent that the emulator can run the same software, data and so on. For electronic mail purposes, a computer will often run terminal emulation software. The term emulator is also used loosely to refer to computers sold on the basis that they work exactly like other computers, e.g., IBM emulators, lookalikes or clones.

■ **Encode:** To put into code which is understood directly by the computer, or to render a program unintelligible.

■ **Encrypt:** Not exactly the same as encode, as it refers to data being made deliberately unintelligible to humans for security reasons. If we translate so that micros can understand things, and micros translate so that we cannot, it is fairly clear who is boss.

■ **END:** The last entry in a pedant's program, telling the computer there is nothing to follow. They generally stop anyway.

■ **Eniac:** One of the first true computers, developed in the U.S. during World War II. It filled a whole room and its computing power was similar to that contained in a Habitat dimmer switch. Well, it was a little more than that then.

■ **EOF:** Technical term used by rugby prop forwards during scrum, along with EEOOF and GRRRK. In computing it stands for End Of File, a character recorded on magnetic media – disc or tape – to mark the end of a particular file.

■ **EPROM:** Erasable Programmable Read Only Memory. It is a chip which allows you to "burn" a program or operating system – a computer's operating system, or O/S is essentially a suite of programs – on to it. The advantage of this kind of chip is that it is easy to change and is much loved by manufacturers who have not finished a machine's O/S but want to sell it anyway.

■ **Error-checking software:** Software which checks the validity of data for you, ranging from spelling checkers upwards.

■ **Error message:** In the bad old days it was a number which could be looked up in the manual and would thus tell you what was wrong with a program. The more user-friendly models now put the words on the screen but that does not make them easier to understand.

■ **Escape:** Many computers have an Escape key which permits you to break out of a program which is going wrong. It doesn't work? Try Shift/Escape. Well, try Control/Shift/Break/Escape. All the best programmers are reduced to pressing as many keys as possible prior to giving up and switching the thing off.

■ **Escape character:** Disguise used by British officers to get away from Colditz, e.g., "Ich weiss kein Deutsch, I yam Swedish engineer." Also a character used with one or more succeeding characters which will make the computer understand succeeding characters differently. Escape characters, when sent to printers, can change the type or format of the output.

■ **Ethernet:** A data communications network developed by a number of U.S. companies with the pious and laughable hope that it would be accepted as a computer industry standard.

■ **Execute:** Micros do not do jobs, they execute them. Execute, or EXEC, is used generally with reference to the direct memory access which calls a machine code routine. CALL is also used, as is RANDOMIZE USR on Sinclair machines, but murder, top and assassinate are uncommon.

■ **Expansion card:** A circuit board produced by manufacturers of under-powered computers to allow them to sell you more equipment.

■ **External interrupt:** Pounding on the door heard while playing Super Zaxxon. Also an interrupt produced by an external hardware device. See **Interrupt.**



■ **Fanfold:** Origami term used in CAD systems. Also continuous feed paper, which you can fan and fold – or put in the printer.

■ **Fibonacci series:** A series of integers where each is the sum of the two preceding it in the series, e.g., 1,2,3,5,8,13. Mathematicians get excited about them and write articles with many pretty diagrams based on Fibonacci.

■ **File:** A collection of data, generally stored on an external device, e.g., tape file, disc file, nail file and so on.

■ **File attribute:** A feature of a file which can be changed by the user, often making it unreadable. File characteristics cannot be changed.

■ **File maintenance:** Largely theoretical term governing the process of keeping files up-to-date.

■ **File specification:** A way of identifying a file which generally will include name, type and location on disc. Abbreviated to filespec.

■ **Firmware:** Company tie.

R COURSE

›ntinues as we present another extract : explanation of computing terms.

Also programs stored on a chip which are not lost when the machine is switched off, as software is.

■ **Flag:** A marker used to denote a particular thing about a computer's state. Red flag on the Pentagon indicates the Russians are there, Stars and Stripes indicates they are not.

■ **Floppy disc:** You should not flop even the ones that do flop. They are flexible discs which store data in magnetic form, although the newer types are in rigid casing.

■ **Flowchart:** A diagram used to represent the flow of a program, or more likely a projected program, sometimes used to avoid having to write the thing in the first place. If you have seen a flowchart with a box labelled "really amazing graphics sequence", you will understand this.

■ **Font:** A font defines the size and design of a set of print characters and at weekends is used by the vicar for christenings. That is why print unions have chapels rather than branches.

■ **Format:** A command used to order a disc so that it can be used by a particular computer. As it wipes all the data from the disc it is used most commonly on the most vital disc you have rather than the blank one which you meant to use.

■ **Forth:** Every so often someone goes bankrupt trying to sell a micro which runs the Forth language rather than Basic, because Forth is faster, better-structured. An language which uses something called "Reverse Polish Notation" can't be all bad, but it will never catch on.

■ **Fortran:** Language used in science and engineering by people who don't eat quiche.

■ **Front end:** A user-friendly front end is supposed to be a system which is easy to learn and understand and which allows you to operate the system without meeting the operating system. It can also function as a device to prevent you learning about the machine, or to con you into buying a turkey because it looks easy.

■ **Full duplex:** A mode of transmission which allows data to move in both directions simultaneously, like patting your head and rubbing your stomach at the same time.



■ **Garbage:** Used generally of the output of a computer when it should make sense but it does not. It is more common in the programming input but programmers don't see things that way.

■ **Gigabyte:** One billion bytes. Techies salivate over the things they could do with this kind of memory, although they tend to forget how long a lifespan they would need.

■ **GIGO:** Garbage In, Garbage Out. One of the two basic truths of computing, the other being Nobody Ever Got Fired For Buying IBM, although NEGFFBI does not really roll off the tongue.

■ **Glitch:** Technically a sudden change in voltage level but used indiscriminately of anything which goes wrong, e.g., "Waiter, there's a glitch in my soup."

■ **Global variable:** A variable which is defined for the whole of a program, as opposed to a local variable, which applies only to a part.

■ **GOTO:** Command which jumps the flow of a program to another part of it. Structured programmers deplore its use, preferring to foul their programs in other more structured ways.



■ **Half duplex:** A method of data transmission where data can be sent only in one direction at any given time.

■ **Hand assemble:** To assemble a program without having an assembler do it for you.

■ **Handshaking:** a signal exchange between a computer and an I/O unit used to synchronise the operation of the two. Computers, being more polite than you would think, tend to shake hands before they get down to business.

■ **Hands on:** The experience whereby you touch, learn about, drop gob-stoppers down and generally break the real thing, as opposed to reading about it.

■ **Hard copy:** Extremely deep, unintelligible program listing. Also a paper printout of information.

■ **Hard disc:** Concurrent DOS really but most people think of a hard disc as a rigid disc fixed in a sealed environment. The disc rotates faster than a floppy and has greater storage capacity. Also known as a **Winchester.**

■ **Hardware:** Computer hardware is the physical part of the system, as opposed to software, the thinking bit. For some reason computer hardware is not so tough as proper hardware, i.e., saws, hammers and so on.

■ **Hardware interrupt:** An interrupt requested by a peripheral device.

■ **Head:** The reading head of a storage unit, either tape or disc.

■ **Head crash:** An analogous to dropping the needle on to a record from a great height. The head on a Winchester is cruising round, minding its own business, when suddenly it bumps into this monstrous piece of dust and . . .

■ **Header:** Part of a tape or disc which contains details of the files stored there.

■ **Hertz:** Unit of frequency, abbreviated to Hz, governing, among other things, the speed or clock speed of a micro.

■ **Hex:** Short for hexadecimal, the counting system based on 16 rather than 10. It is used as a shorthand way of writing binary.

■ **High-level language:** Computers word faster if you talk their language but you can't. A high-level language is a programming language like Basic which allows you to do complex things while having them interpreted for the computer.

■ **Hook:** Usually used of software, hook describes an expansion capability which will allow programmers to add facilities later. Alternatively, a capability in the software which will permit the manufacturer to put back the piece it ripped out at the last minute as soon as it can get it to work.

■ **Host computer:** A large computer which has a smaller computer in communication with it.

■ **Housekeeping:** A series of routines a micro performs at set times in its operation, typically checking its status before becoming available for operation. Computers wash the dishes before they go to work.

Orchestral Manoeuvres

The Musical Instrument Digital Interface standard for connection between electronic musical instruments and computers has been in existence only a few years but it is appearing on machines developed by everyone from Atari to Sinclair, with a major participation from many of the Japanese companies which make the musical keyboards.

It is a serial, digital computer interface and allows up to 16 instruments to be chained for control by the computer. The fact that it is a serial interface has meant that when Sinclair decided to take Midi to the new Spectrum 128 it could double-up the Midi interface and the serial interface on the same socket – it will require only slightly different cables to use Midi instead of the serial port.

There are popular misconceptions about Midi and what it is supposed to do. It does not let your micro 'play music' but instead permits the machine to act as a controller of instruments – a kind of electronic conductor.

At the launch of the Spectrum 128, for example, a large table was set up purporting to show what the Spectrum and Midi could do together. It contained several large music keyboards, loudspeakers and a few amplifiers; almost lost in the middle of it was a lonely Spectrum 128 connected to a TV set with musical notes flashing on the screen.

The major point is that your Midi operation will be only as good as the instruments you plug into your Midi port – the existence of the port does not enhance the musical ability of your machine significantly – and the software you use. All the Midi interface essentially allows you to do is to control the flow and type of control codes sent to the instruments which regulate things such as echo, delay and reverberation.

It sounds obvious but you also need to make sure that the instruments you want to use with your Midi micro also contain the Midi interface. There have been previous attempts to construct music/computer interfaces but only a Midi-standard interface on your instruments will work with your Midi micro.

Cost will also be an important factor in how your Midi system is set up. There is no point in spending money for a micro with a built-in Midi – or buying one of the many new Midi interface add-ons for machines like the BBC micro – if you do not have the funds for some worthwhile Midi instruments to plug into it. Midi equipment does not mean an average £50 add-on; it usually runs into several hundred pounds.

Good keyboards are vital for most music input when using Midi. You should look for something which is flexible, offering a large number of instruments, and a full-size keyboard. If you are trained in using a full-size piano keyboard, you may find that many Midi keyboards are too small for you to use.

With many Midi systems you will also need a good amplifier and speakers into which to plug the Midi micro and keyboard. Be very careful to ensure that the speakers into which you plug your Midi into are powerful enough to handle it. Too much power put through cheap speakers or a bad amp could ruin them.

The future for Midi looks bright, with large numbers of manufacturers introducing new equipment which conforms to the Midi hardware standard and a good deal of new Midi software being developed. There is even talk of providing Midi interfaces for lighting and graphics devices so that light shows can be attached to Midi set-ups.





UMI-2B interface

Pop music has long been associated with complex electronics and expensive musical equipment, yet the success of groups like Ultravox, Tears For Fears and, most recently the Norwegian band A-Ha, may lie in something as inexpensive as the BBC micro.

The secret of the system lies in the development of Music Instrument Digital Interface and an interface called the UMI-2B. Midi has become a standard in the music industry and can be found at the back of many modern electronic keyboards, drum synthesisers and multi-track tape recorders.

Acting as a serial digital computer interface, Midi allows up to 16 instruments to be chained together and controlled by each other or by a computer. While a basic Fairlight – the Fender guitar of the modern electronic pop world – makes extensive use of Midi, the price of it has risen from £28,000 to more than £50,000. Meanwhile, the UMI-2B, designed for exclusive use with the BBC micro, costs only £499.

Complete with software on ROM, a rather scanty manual and all the necessary connections, the UMI is housed in a BBC beige box which plugs into the 1MHz bus and the user port. With the BBC switched on a simple *UMI command takes you instantly into the recording studio.

The easiest way to describe the system is to run through the creation of a song. My musical career ceased abruptly in my juvenile piano lesson days, since which time my greatest rendition was using a comb and tissue paper. Yet the UMI system, combined with the simplest of the Midi keyboards – the Casio CZ101 – let me develop a complete re-mix of the Axel-F theme song from the film Beverly Hills Cop.

Having played with the keyboard and any drum machine to hand, the aspiring musician should have an idea of how a song will sound. I already knew how the song should sound because I possessed the record.

Having selected real-time input from the main menu, you have to define the length of your first sequence of notes. That can be almost any length from one to 16 bars, and obviously can include chords. Pressing the button on top of the UMI gives a four-beat count-in before you start playing. Otherwise recording begins the moment you press the keys. Alternatively, if your playing ability is restricted, step time allows each pattern to be put together, note by note.

Remember that each note played is stored by the BBC as a number and the BBC makes no sound. The tunes played by the computer will sound different depending on which keyboards are connected and which instruments are selected on those keyboards.

Having defined the first section, it can be played back while you play an accompaniment. That, in turn, will be recorded as a separate section. Having produced up to 127 of those patterns, you can use them to create the song.

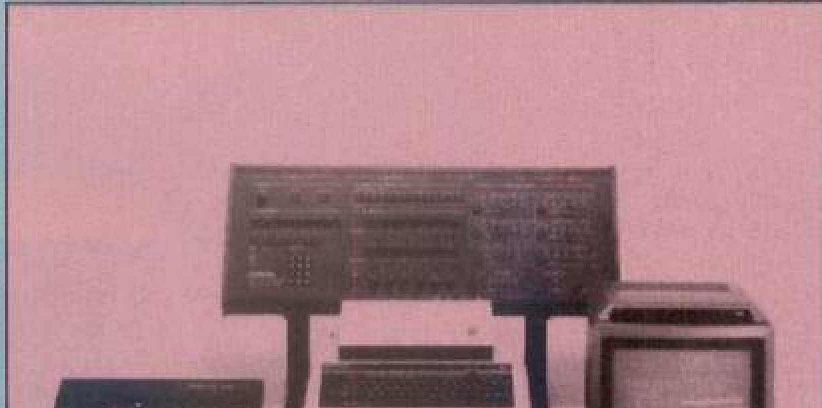
The 16 channels act as 16 sequences of music which can all be played together. That is more than most people can cope with but simply stringing together sequences in two or three channels – one as the base line and another as the main tune – you can produce complete songs. The UMI-2B has put musical composition within reach of most aspiring bands, while remaining powerful enough to attract bands like Blancmange, a Flock of Seagulls, and even Queen. One particular fan of the system is Vince Clarke, formerly of Depeche Mode, who has even used the system live on stage when touring the country.

New bands can produce complete songs using only a couple of keyboards.

The system also saves considerable expense normally incurred when hiring a recording studio. New bands can produce complete songs using one or two keyboards at home, before taking the floppy disc to the recording studio and slotting it into the disc drive. It is much more attractive to a record company than yet another cassette tape.

Thanks to The Rock Shop in Camden, London, for loaning us the UMI and keyboard for the course.

A complete UMI-2B system. ▼



To structure or not — that is the question

Geof Wheelwright looks at the great programming debate

One of the great debates among programmers centres on the need for structured programming, which divides the large number of jobs in any program into small, manageable portions. The logic behind that is obvious. Like anything you build from a series of parts – whether it is a car, a television or a computer program – the ability to strip it into its essential components makes it easier to service. Your car, for example, is designed so that if the water pump breaks down, you have only to replace that and not the entire engine. The key, of course, is ensuring that you can diagnose the fault as being caused by the water pump.

With computer programming, you construct all the constituent parts and thus have a chance to test each of them individually before you fit them together. Most computers also have the added advantage of giving error messages when your program malfunctions after you have fitted together the constituent parts. That tells you immediately where to find the error and which part of the program needs repairs.

All too often we see clever little pieces of software brought together in a huge stadium of code, only to riot against one another and cause on screen havoc. Structured programming can result in code overkill.

If you have read your manual and done some programming, you will probably know all this. What you may not be familiar with are the pros and cons behind the structured programming debate. We present both sides of that argument, with the opposition opening the debate on the motion "PROCedures, GOSUBs and a structured approach is the ONLY way to program".

CON: While there is a good deal of merit to the idea that modular programming, in which the main objective of the programmer is to string together many little pieces of program to make one big program, eases debugging and design, it can often make it more difficult. Without careful attention to the original purpose of the program, programmers can become immersed in the detail of various routines and waste time looking for more and more elegant ways to solve relatively inconsequential problems in the routines which drive the main program.

That can happen sometimes to such an extent that the whole program can become subservient to the grace and elegance of one of the programmer's pet routines. A realistic design specification and a plan of attack which allows only a certain amount of time for the design of each routine would make better and more prolific programmers of all of us.

All too often we see clever little pieces of software brought together in a huge stadium of code, only to riot against one another and cause on-screen havoc. Like a writer who tries to string together too many bad metaphors and forgets the original topic, each routine is not on its own – it must work well with the rest to produce a good result.

Structured programming can also result in code over-kill. When the program is divided into so many tiny little jobs, tasks can be duplicated, new variables being created where old ones would suffice, with the general speed of the program being badly-affected because the machine is spending too much time doing unnecessary tasks.

Structure and planning are important but do not become so obsessed with producing all the little routines which make up the program that you forget about the need to make them all work together in the end.

PRO: If you are to do anything in life properly you need a plan. That is probably more true of computer programming than almost any other pursuit you might consider. With no overall blueprint, you constantly have to fix one portion of programming as it falls out of kilter with the next.

A good structured programmer makes copious use of PROCedures, where they are available on machines such as the BBC micro and the Sinclair QL; or GOSUBS – where they are not, such as on the Commodore 64 and the Sinclair Spectrum. By designating each of the major jobs in the program as a procedure or subroutine, each can be tested and inspected individually. Some may suggest that leads people to spending far too much time with each but I would submit that it brings out the best possible in each section of the software.

If you spend a long time on one exceptional method of doing something – such as the 3-D graphics effects on Spectrum *Ant Attack* or the software-driven speech synthesis in Commodore 64 *Ghostbusters* – that technique may prove to be more important than the rest of the program. A structured program is a happy program.

It is, of course, your prerogative but, overall, the proponents of the structured approach tend to win the debate every time. Without being too santimonious about it, however, you should bear in mind that all those lovely pieces of structured programming will have to work properly together in the end and no amount of routine-writing will change that.

If you are to do anything properly you need a plan. A good structured programmer makes copious use of PROCedures or GOSUBs.



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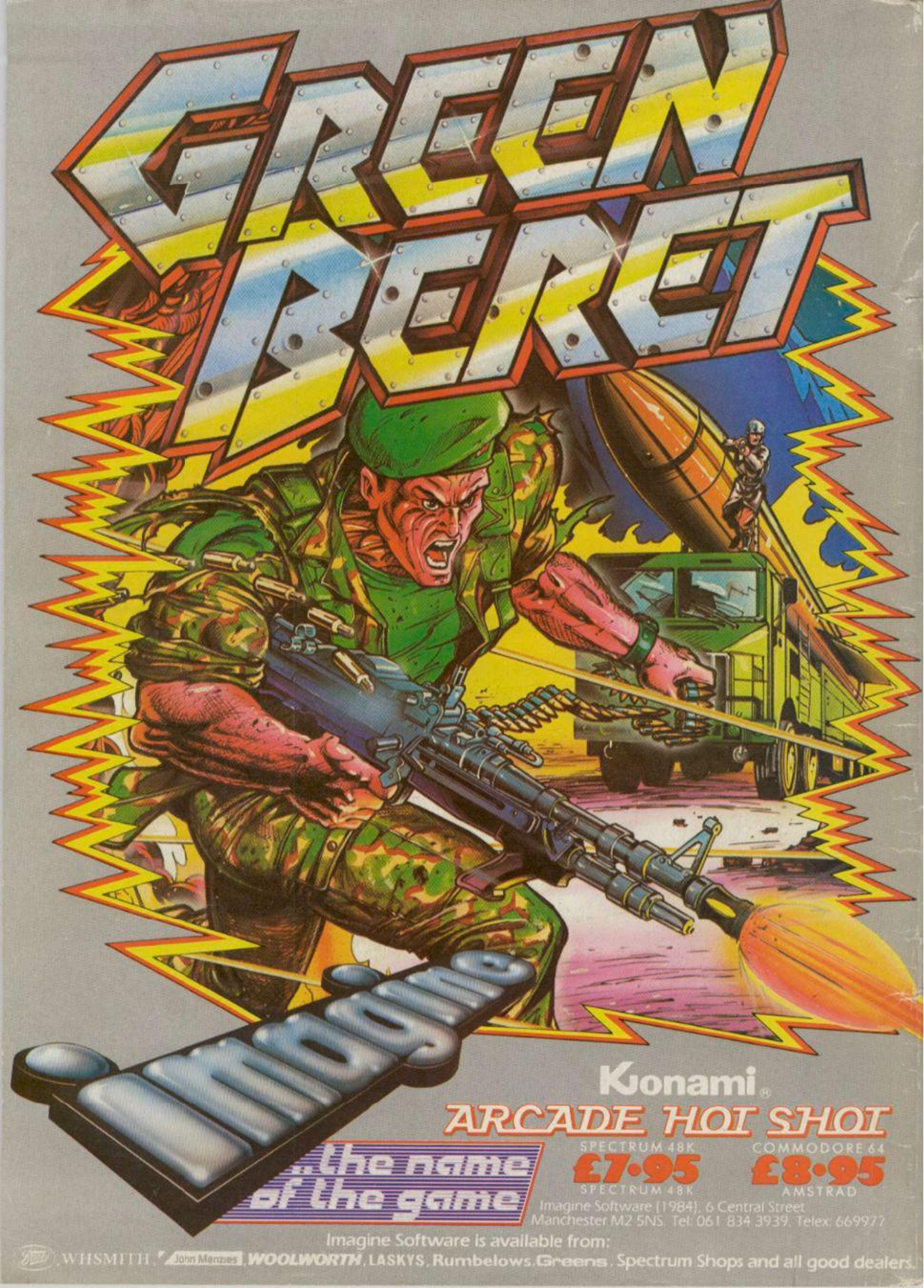


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